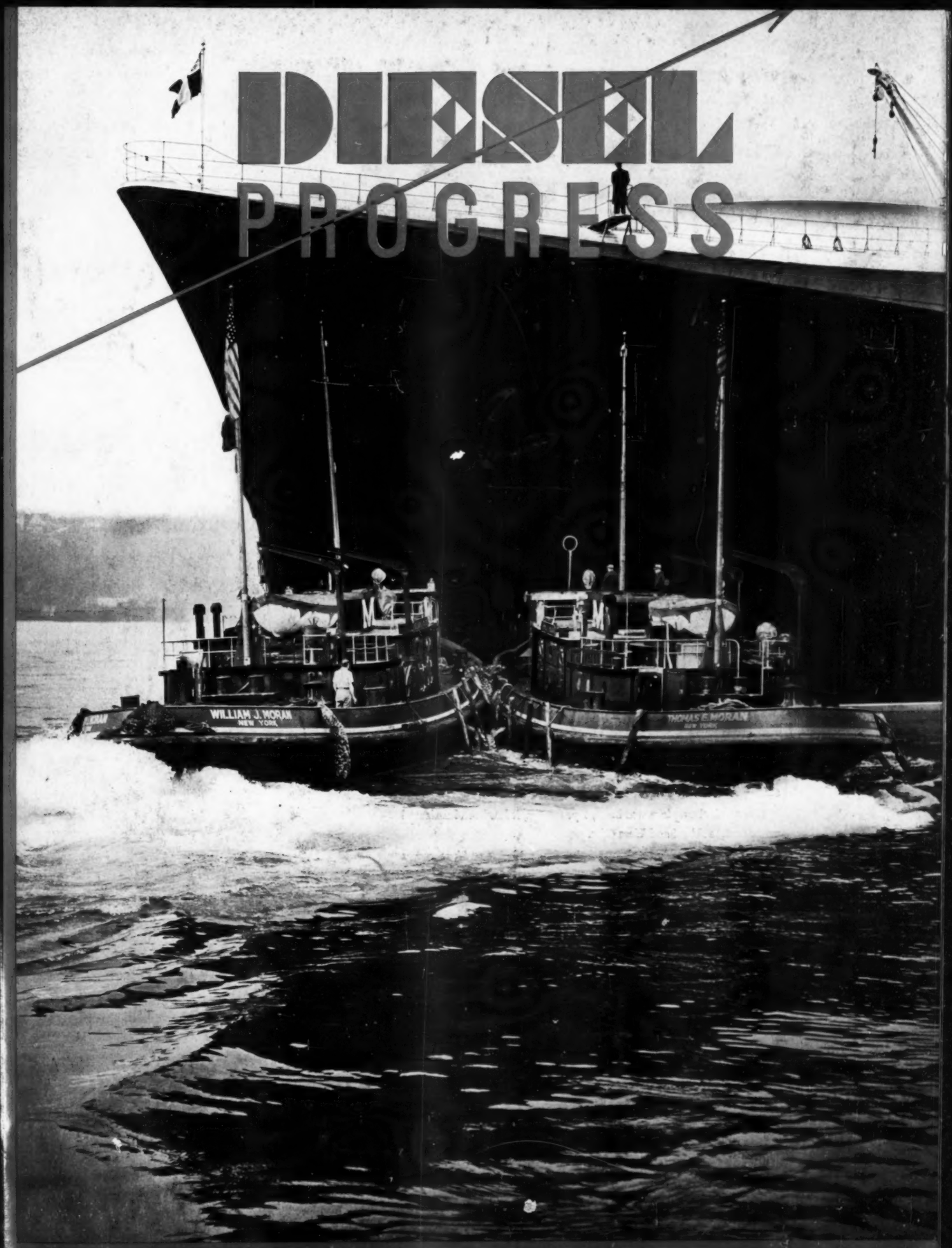
DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

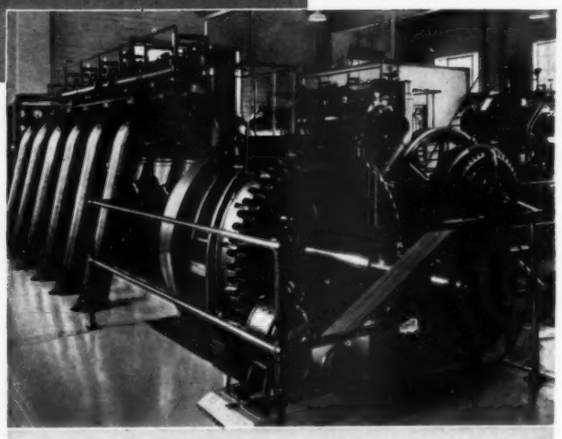


FEBRUARY, 1939 CIRCULATION OF THIS ISSUE—IN EXCESS OF 14,000 COPIES 25c

A Showplace of 7 States

GENERAL VIEW *of Diesel power plant in Blooming Prairie, Minn. Spick-and-span, beautifully landscaped, it's a showplace.*

BELOW. *All 3 Diesels in this showplace power plant are Texaco lubricated exclusively, since they first went into service.*



MODEL PLANT ALSO AN EFFICIENT ONE

Located in Blooming Prairie, Minn., the power plant illustrated here is visited by people of 7 surrounding States, interested in seeing Fairbanks-Morse Diesels at work in ideal surroundings.

Since this showplace was built, 7 years ago, it has been lubricated with Texaco Algol and Ursa Oils.

A year ago, a 450 h.p. F-M Engine was added, and Texaco was again chosen as the lubricant. "Cylinder wear very slight, never a bearing failure" reads the report.

To get outstanding lubrication results in *your* plant, get in touch with Texaco. Trained lubrication engineers offer aid in selecting and applying Texaco Lubricants. Phone nearest of 2186 warehouses or write direct to:

The Texas Company, 135 East 42nd Street, New York City.

BE SURE YOU READ THIS

...Texaco's "Diesel Operation"...80 pages of charts, diagrams, photographs, and text that you will find helpful. Write for your copy.

TEXACO Algol and Ursa Oils

FOR DIESEL LUBRICATION

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment—Every Wednesday Night—Columbia Network—9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 6:00 P.S.T.

DIESEL PROGRESS for February, 1939. Volume V, No. 2. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at Brooklyn, New York, authorized May 14, 1935. Subscription rates: United States and Possessions $3.00. Canada and all other countries $5.00 per year. Single copy price 25 cents in U. S. A., 50 cents for all other countries.

DIESEL PROGRESS and DIESEL AVIATION

CONTENTS • FEBRUARY

REX W. WADMAN
Editor and Publisher

FRONT COVER ILLUSTRATION: Two new Diesel-electric tugboats docking the *Normandie* on a recent arrival at New York. Powered by General Motors 2-cycle Diesel engines, these Moran Towing Co. tugs are making New York harbor history by reducing, by half, the work of docking huge ocean liners.

TABLE OF CONTENTS ILLUSTRATION: At the Tionesta Dam, a flood control project at the mouth of the Tionesta Creek, a tributary of the Allegheny River, a fleet of eleven Caterpillar units are digging the spillway which will furnish some 800,000 yds. of dirt and 250,000 yds. of rock.

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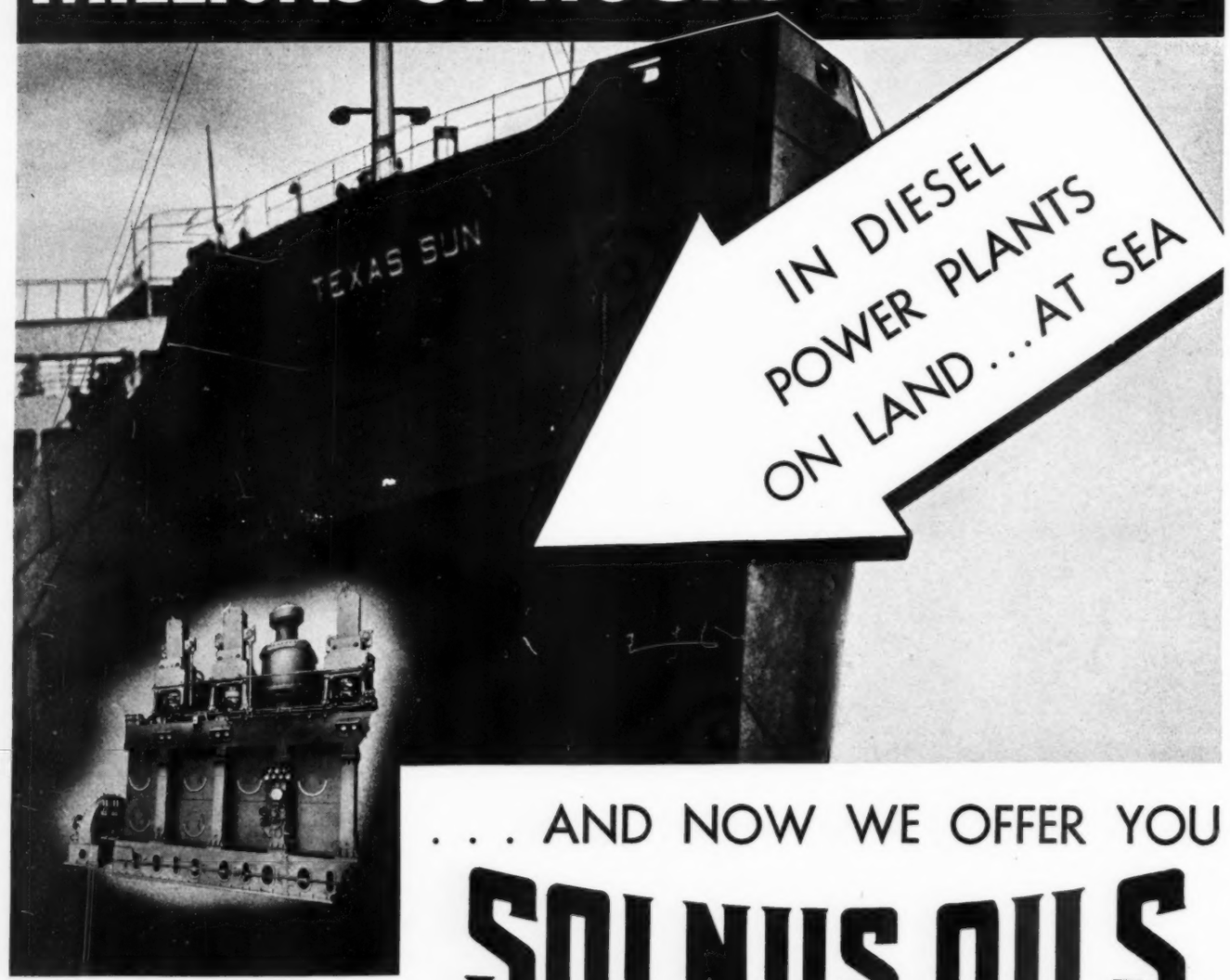
MILLIONS OF HOURS OF PROOF



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Developed by our own engineers . . . made in our own refineries . . . and then long before they were offered to you — or even placed on the market — SOLNUS Oils were proved by millions of hours of actual performance in our own Diesel equipment — both marine and ashore.

Performance in giant Diesel installations have definitely proved SOLNUS Oils to form less than one-quarter the amount of carbon and sludge as compared with many competitive oils. In fact, users tell us that when SOLNUS Oils were used, in engines previously lubricated by competitive oils, they actually cleaned out the inside of the Diesels by dissolving power killing sludge.

Here's your opportunity to keep your Diesel engines cleaner . . . make them last longer . . . and cut down maintenance costs — write for complete information about SOLNUS Oils. You'll save yourself money . . . you'll prolong your engine's life.

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PETROLEUM PRODUCTS FOR ALL INDUSTRIES

DIESEL PROGRESS

REX W. WADMAN, Editor and Publisher

DETROIT, January 12, 1939—Yesterday, at the Society of Automotive Engineers' annual meeting, Major General H. H. Arnold, Chief of the United States Air Corps, in answer to a question, stated "Our engineers say that gasoline engines are so rapidly approaching the capabilities of Diesels that Diesels seem to be going by the board."

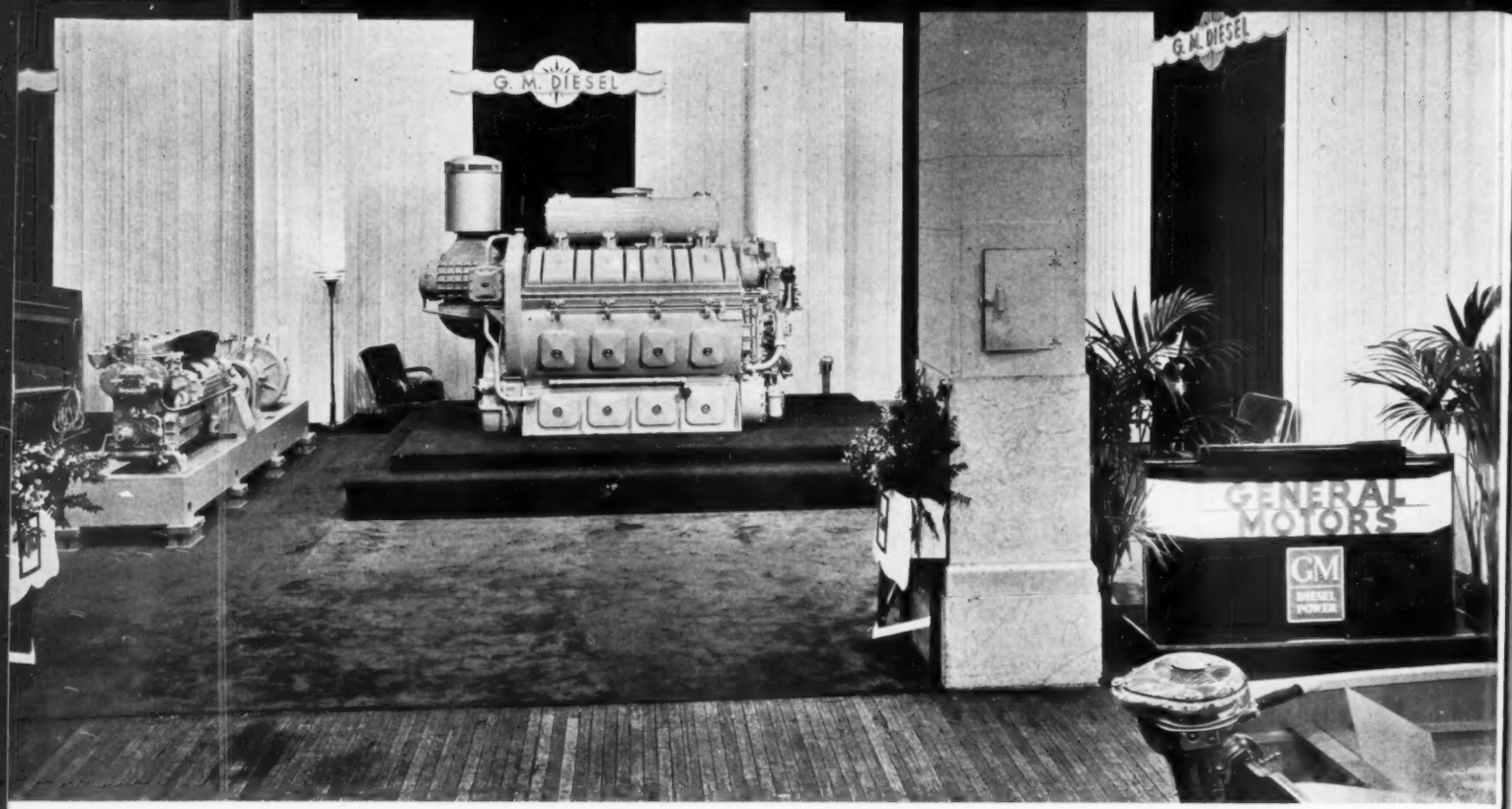
Yesterday, also, at this same meeting, Captain John H. Towers, Assistant Chief of the Bureau of Aeronautics for the Navy, stated "the Navy has spent thousands and thousands of dollars for a Diesel of suitable horsepower—but we just haven't got it."

This typifies the thinking of the officials who are entrusted with our progress in aviation. So typical of the ostrich hiding its head in the sand to avoid seeing danger, to escape the inevitable.

As Boake Carter, in his syndicated column in tonight's newspapers, so aptly states, "If Diesel engines performed no better than gas engines and their weight was the same, as well as their rate of fuel consumption, there still remains two basic reasons why aviation in America should drive for oil engines immediately. The major reason is safety from fire which has caused so much loss in property and life. Consider the army transport which blew up recently. Consider the Samoa Clipper as another recent example. The second reason is the fuel cost. Gasoline engine makers never explain it to the public, but usually they test and rate their engines on high octane gas—around 28c. a gallon. Number three, fuel oil in the same quantity costs around five to six cents a gallon."

Can our highly placed officials be entirely ignorant of what is and has happened in Europe? The readers of DIESEL PROGRESS apparently know more about the Diesel aviation situation than do these men; yet for three years, each month, we have published an article dealing with the progress of Diesel aviation abroad. These articles have been available to both of these men, for the magazine circulates freely through both departments.

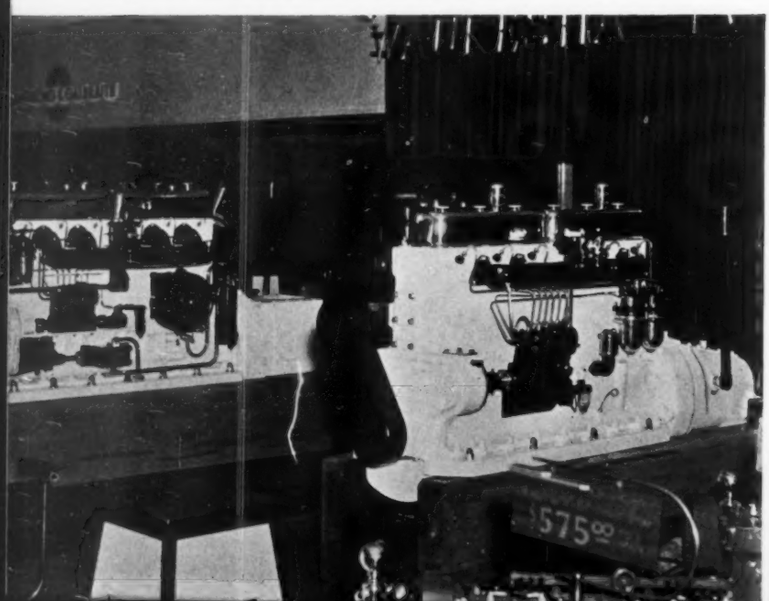
Rex W. Wadman



One of the most outstanding exhibits at this year's show was the 640 hp., 8 cylinder, V type, 2 cycle General Motors Diesel as ordered for installation in four Coast Guard Cutters. These engines will give the new 110 ft. vessels a speed of approximately 12 knots and a cruising range of about 3,500 miles. In addition, the small auxiliary Diesel generator and pump mounted integrally on a common steel sub-base and supported by Hussman spring mountings received much favorable attention due to its compact construction and assembly for marine service. This 6 cylinder unit develops 90 hp. at 1,200 rpm.

THE MOTOR BOAT SHOW

The well known 175 hp. Defender and the 215 hp. Wanderer, resplendent in white paint, comprised Waukesha's marine Diesel exhibit. Both engines are six cylinders, four cycle units. The former turns at 1,500 rpm. with a bore and stroke of 6¼" x 6½" as compared with 1,050 rpm. and 7" x 8½" for the larger engine.



By OTIS A. SIBLEY

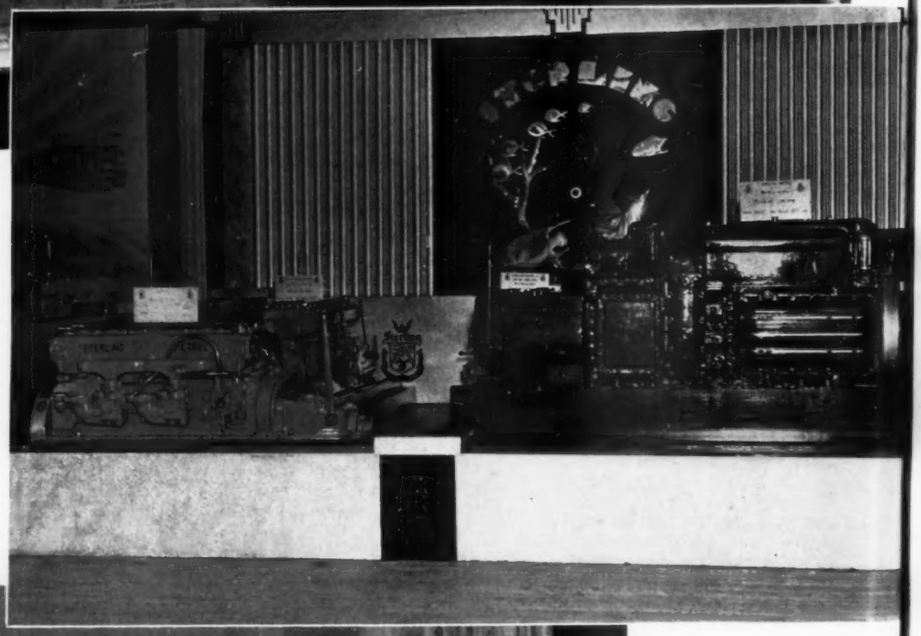
THE Thirty-fourth Annual Motorboat Show, held at Grand Central Palace in New York from January 6 to the 14th, inclusive, hit a new high for marine Diesel exhibits. The marked increase in the manufacturers represented and the number of engines shown was equalled only by the intense interest of the thousands who attended. Of particular importance in this regard was the attitude of the great majority who found the Diesel exhibits the most attractive part of the show. This was evidenced by their intelligent questions and discussion of marine Diesel applications and operations from the standpoint of potential buyers.

Exhibited for the first time at a National Motorboat Show, the Gray Marine Diesels constituted an important addition this year. These sturdy, compact units are based on the Diesel developed and built by General Motors and are adapted and equipped for marine service by the Gray Marine Motor Company. They were shown in 1, 3, 4, and 6 cylinder sizes with and without reduction gear drive. Although new to the Motorboat Show, Gray Diesels have had ample opportunity to prove themselves for marine service in a variety of installations.

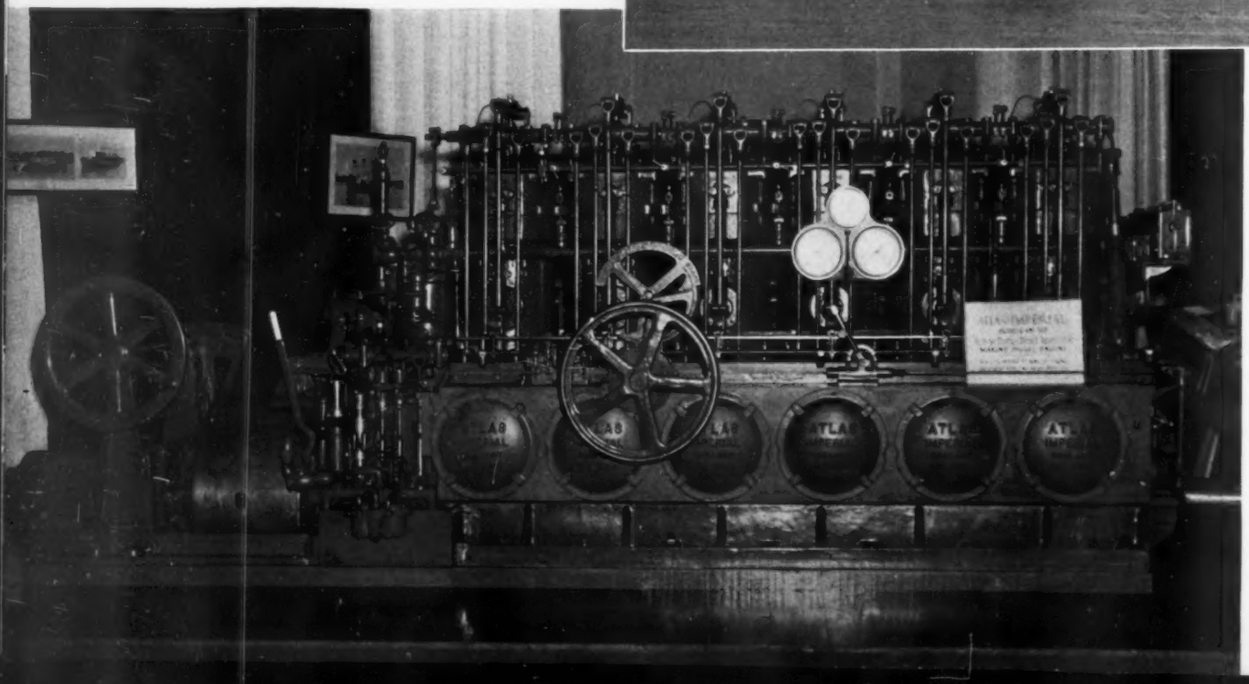
Superior introduced an interesting display of two engines mounted side by side as they would be installed for twin screw operation. These were 8 cylinder units rated 230 hp. at 1,500 rpm. and driving through reduction gears. The clean-cut appearance of these engines and the relatively small space required for a parallel installation totaling almost 500 hp. was most impressive. Single units shown included an 8 cylinder, 150 hp. Model MA turning at 1,800 rpm. and a 6 cylinder, 110 hp. engine of the same model partially cut away to show interior construction and detail.

Due to the wide range of marine Diesel types and horsepower ratings represented, guests of the show could find the exact units to meet their requirements whether for work or pleasure; main propulsion or auxiliary service; two cycle or four cycle operation; or direct, gear or V-belt drive. While accurate figures on sales during show week are not available at this time, there can be no doubt that the keen interest shown will be translated into orders and deliveries in the near future. For the benefit of those unable to attend this year's show, illustrations and brief comments on the principal exhibits are given herewith. Space does not permit showing the American-built Covic display of opposed piston, two cylinder engines for main propulsion and auxiliary service. All of these units are rated at 20 hp. at 3,000 rpm. Lathrop, also, is not shown but introduced for the first time an interesting four cylinder, four cycle, 50 hp. marine Diesel. John Reiner was also present with his compact auxiliary sets which consist of Stover Diesels driving various combinations of generators, pumps and air compressors for all types of service.

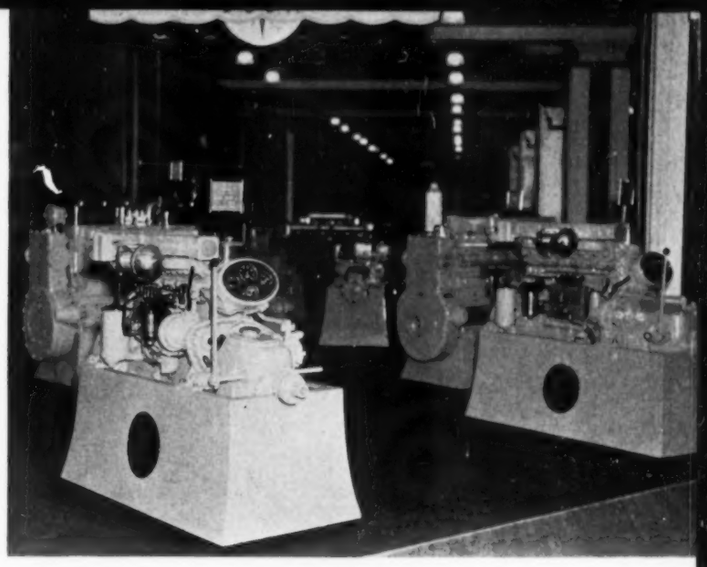
For heavy duty marine service, Fairbanks Morse displayed five Diesels ranging from one to eight cylinders and in power from 10 hp. to 240 hp., both two and four cycle. The single cylinder auxiliary connected to a generator, rotary pump and air compressor was particularly interesting for its compact assembly.



Those familiar with the famous old sailing ship, "Joseph Conrad," had an opportunity to examine a duplicate of the Atlas Diesel which she carries for auxiliary power. This is a six cylinder, 9" x 12", four cycle Diesel rated at 160 hp. at 325 rpm. and direct connected through a sailing clutch.



No Motorboat Show would be complete without the Sterling horizontal "uniflow" Diesel which eliminates crankshafts, camshafts and valves due to its unique construction. The saving in headroom is obvious from the above illustration.



Two six cylinder Kermath propulsion Diesels rated at 84 hp. and 113 hp. respectively, driving through reduction gears, and a four cylinder, 60 hp. auxiliary Diesel generating set were ample proof of Kermath's popularity among yachtsmen and marine operators.

Six models of the Buda Silver Crown Diesels (top right) were variously fitted for direct drive, reduction gears and auxiliary generator service and ranged from 50 to 150 hp. Each was fitted with the Lanova head which is standard with Buda.

The Cummins display was dominated by their six cylinder, supercharged Diesel which develops 200 hp. at 1,800 rpm. with a bore and stroke of 4 7/8" x 6". This unit employs a Roots type blower and indicates the start of a trend among four cycle engine manufacturers. Other Cummins Diesels ranged down to 27 hp., including gear drive, direct drive and electric generator units. The supercharged Diesel weighs only ten pounds per hp.

Caterpillar's latest marine Diesel, Model D4600, was shown for the first time. For continuous duty it is rated at 55 hp. at 1,500 rpm. and drives a 26" x 24" propeller through a 2 : 1 reduction gear. The 100 hp. Model D-13000 with Joes reverse gear and the 135 hp. D-17000 with Twin Disc clutch and reduction gear completed the exhibit.

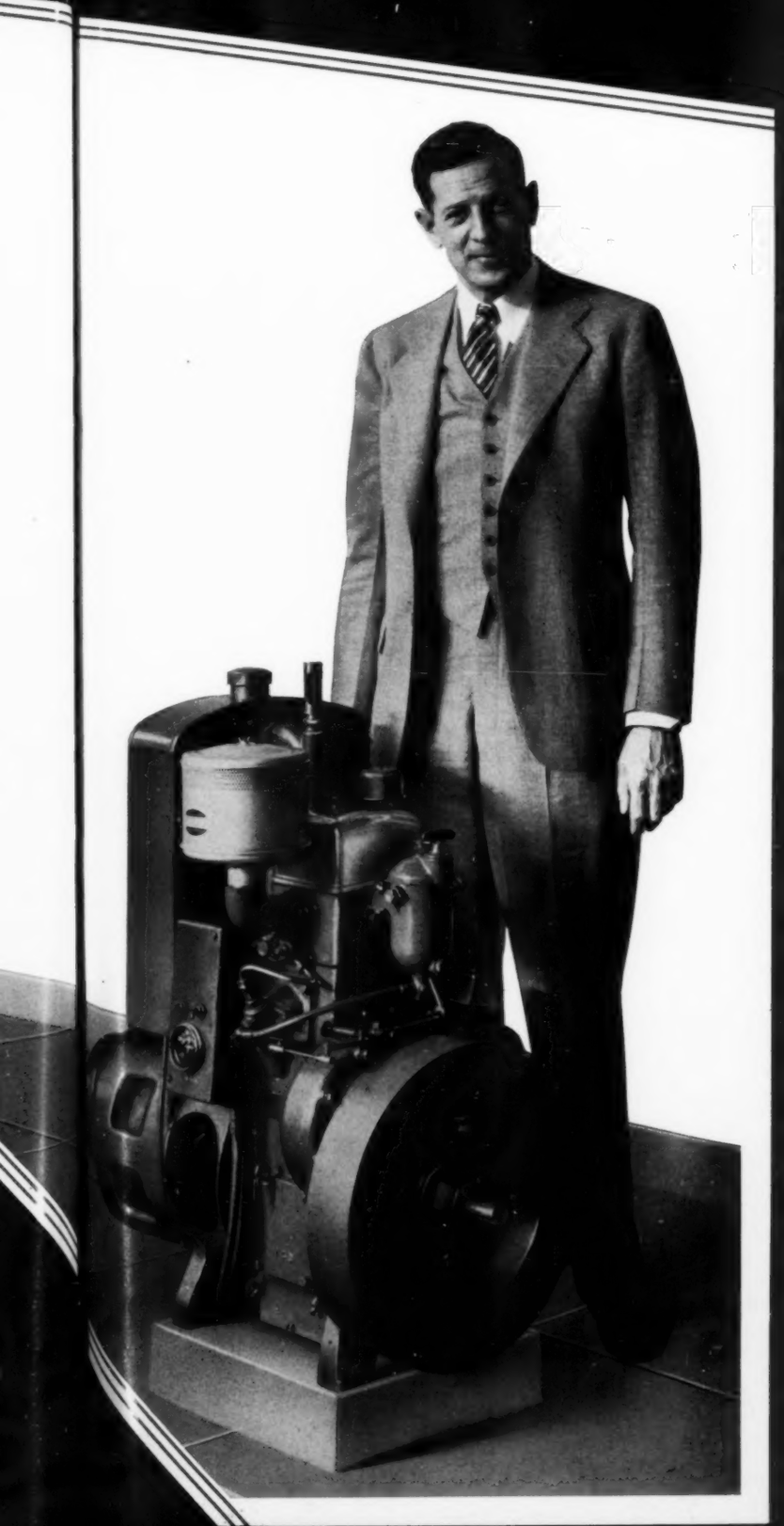
Announcing... ATLAS-T

The design of the Atlas-Thornburg Diesel incorporates the famous LANOVA combustion principle, which, through complete mixing of fuel oil and air and a controlled rate of burning results in efficient combustion, smokeless exhaust, low fuel consumption, and elimination of "Diesel Knock."

Their low compression ratio results in lower bearing and cylinder side wall pressures, greatly reducing cylinder, piston, and bearing wear. Operation at all speeds is exceedingly smooth and maximum efficiency is maintained over the entire power range.

Since the direct flame of combustion is confined to a water-cooled combustion chamber, piston temperatures are low and consequently lubrication is more efficient. That, briefly, is the essence of "The Heart of the Engine."

ORNBURG *Diesels*



THE DESIGNER

The Atlas-Thornburg Diesels were designed by Jack Thornburg, long prominent in aeronautical engineering and flying circles. With over 10,000 flying hours and numerous scientific developments to his credit, he brings invaluable experience and practical ideas to the Diesel Engine industry.

THE NEW COMPANY

Atlas-Thornburg Diesel Engines, Inc., is controlled by the Atlas Imperial Diesel Engine Co. These small engines will be built in the modern factory which this company maintains in Mattoon, Illinois.

ENGINE SIZES

Atlas-Thornburg Diesels, with 3⅛" bore and 3¾" stroke, are today the smallest Diesels of American design and manufacture. They are made in 1, 2, 3, and 4 cylinder units, rated 5, 10, 15, and 20 h.p. at 1800 r.p.m.

FOUR MODELS

These engines will be available in Stationary, Industrial, and Marine types, as well as AC and DC electric generator units, rated 3, 6, 10, and 14 kw.

SALES POLICY

The distribution of Atlas-Thornburg Diesels will be through subsidiaries and factory controlled branches of the Atlas Imperial Diesel Engine Co., supplemented by a dealer organization to be developed in the United States and foreign countries.

SERVICE FACILITIES

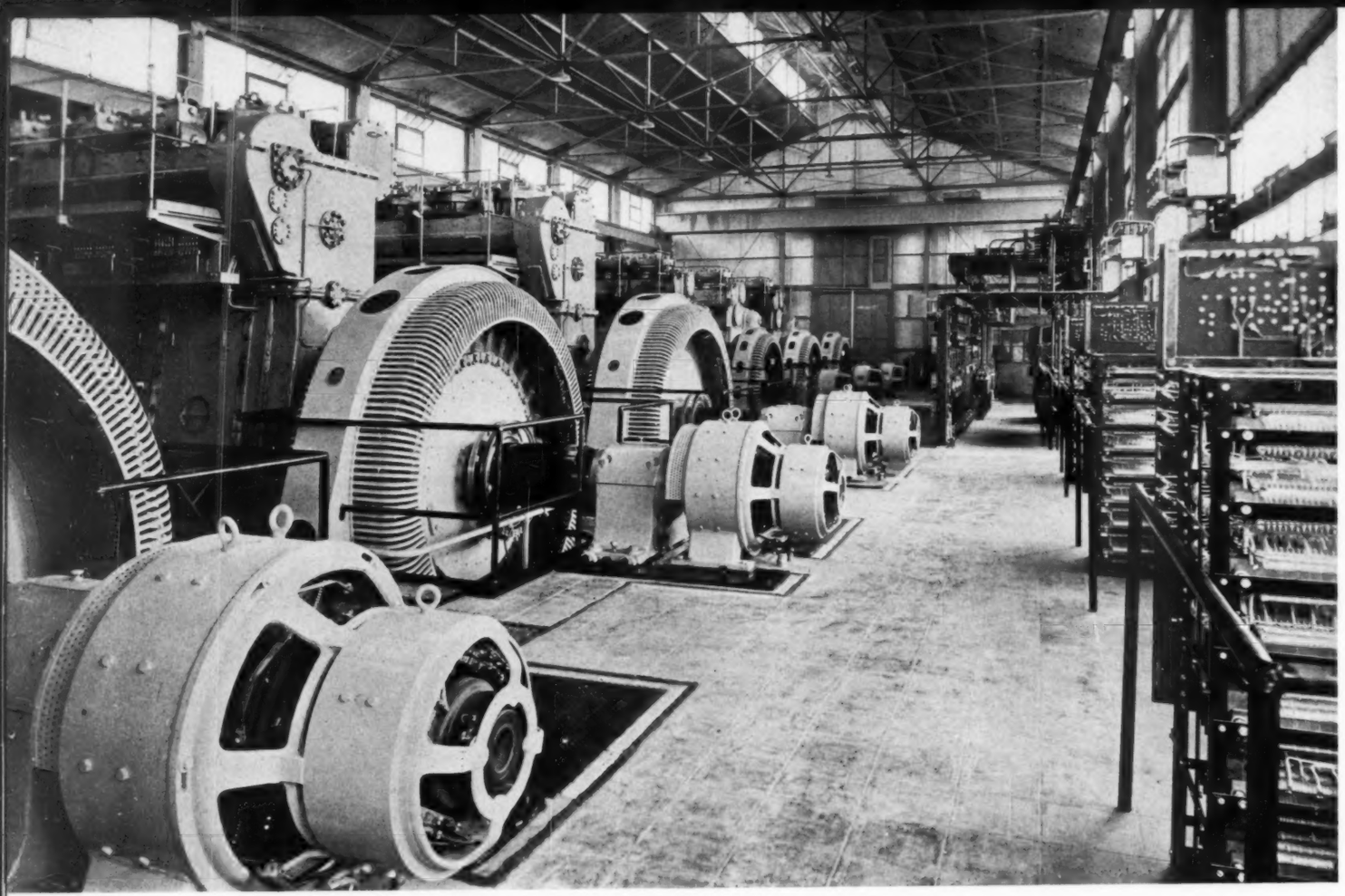
Atlas-Thornburg Diesels will be serviced by the far flung Atlas Parts and Service organization, as well as the service departments which will be maintained by authorized dealers.

ATLAS IMPERIAL DIESEL ENGINE CO.

WESTERN DIVISION
1000 Nineteenth Avenue
Oakland, California

CENTRAL DIVISION
228 North La Salle Street
Chicago, Illinois

EASTERN DIVISION
115 Broad Street
New York, New York



General view of the Brawley Diesel plant: three new engines in the foreground, three original 3-cylinder engines in the background.

IMPERIAL VALLEY POWER PROJECT, CALIFORNIA

Brawley Diesel Plant

By M. J. DOWD*

THE "Boulder Canyon Project Act" passed by Congress December 21, 1928, authorized the construction of the "All-American Canal." In accordance with the terms of the Act, a contract was entered into between the United States and Imperial Irrigation District providing for the construction of the canal and appurtenant structures. By the terms of the Act and the contract, the Imperial Irrigation District was given the right to develop and utilize the various drops along the All-American Canal, which provide sufficient head for the economical installation of power plants, with the provision that the net proceeds from such power development be paid to the United States and applied to the cost of the canal until the canal is paid.

The passing of the "Boulder Canyon Project Act" marked the beginning of a new era for the Imperial Valley. The construction of the Boulder Dam, Imperial Dam and the All-American Canal would remove the ever-present dread and fear that the Colorado River might again overflow and inundate the valley, the principal part of which is below sea level. The possibilities of the production of cheap power meant the beginning of industrial development. Electrification of homes would now remove much of the drudgery and the hardships which made life in the valley almost unbearable during the hot spring and summer months. All this meant a virtual rebirth of the entire economic life of the valley.

In anticipation of the utilization of the power possibilities on the All-American Canal, Imperial Irrigation District began construction of its power system in 1936, with the installation of a 2,250-kw. Diesel electric generating plant at Brawley and the construction of a local distribution system in the immediate vicinity. This was the first step in the District's program which contemplated the development of power on the All-American Canal and distribution to

*Chief Engineer and General Superintendent, Imperial Irrigation District.

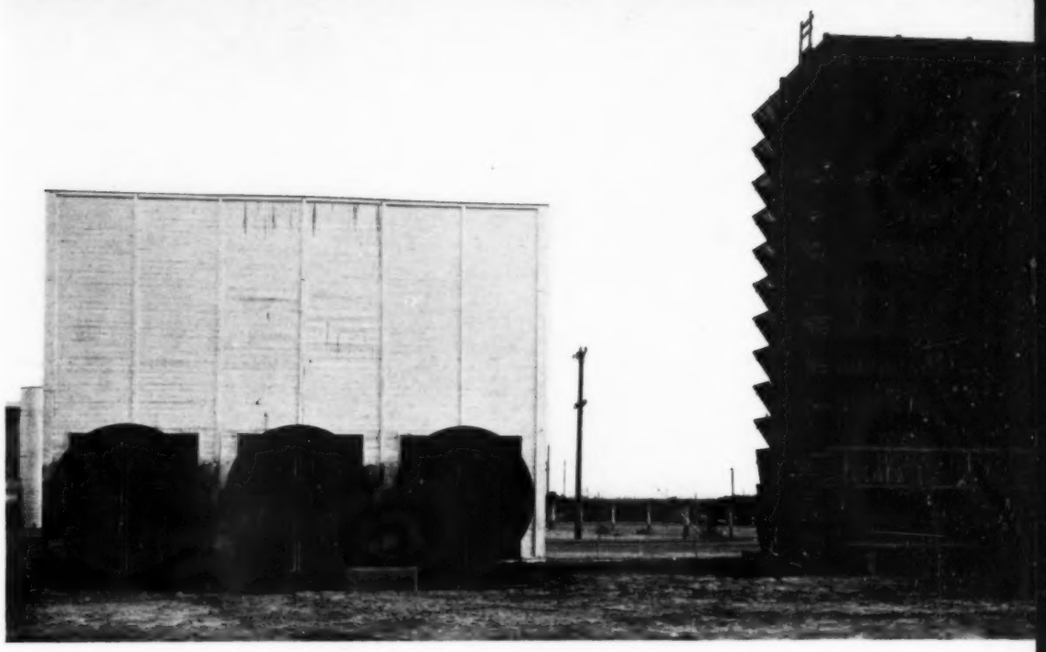
all of Imperial and Coachella Valleys and the adjoining areas.

The Diesel installation consisted of three 1,100-hp. Hamilton-M.A.N. 3-cylinder, 2-stroke-cycle, single-acting Diesel engines, each driving a 750-kw., 4,150-volt, 60-cycle, 3-phase Allis-Chalmers generator.

The engines were equipped with attached scavenging blowers of the Roots-Connersville manufacture, attached dual water and oil, Kinney heliquad pumps for both jacket water and lubrication oil. The air filters were the American 20-in. unit frame type and were mounted directly on the ends of the Burgess intake silencers, both being installed inside the building. The Maxim exhaust silencers were mounted vertically on reinforced concrete silencer pits outside the building. The raw-water pumps, lube-oil centrifuge, emergency lube-oil pump and sump tanks were installed in the basement adjacent to the governor end of the engines.

During 1938 the system was expanded to cover the entire Imperial Valley by the construction of 124 miles of 33-kv. line connecting the Brawley Diesel plant with Drops Nos. 4 and 5 on the All-American Canal and with all of the cities and towns in the valley. Thirteen substations were constructed in the various cities and town and four in the rural areas. During this same time 600 miles of 4-kv. and 12-kv. rural lines and 100 miles of 4-kv. distribution lines were constructed to serve the rural, town and city areas.

To take care of the load, three more Diesel engine-driven units were installed at the Brawley Diesel plant, each unit having a net capacity of 1,500 kw., making a total of 6,750-kw. capacity for the Brawley Diesel plant. The first of the new units was placed in operation in October, 1938, and the second and third in November, 1938.

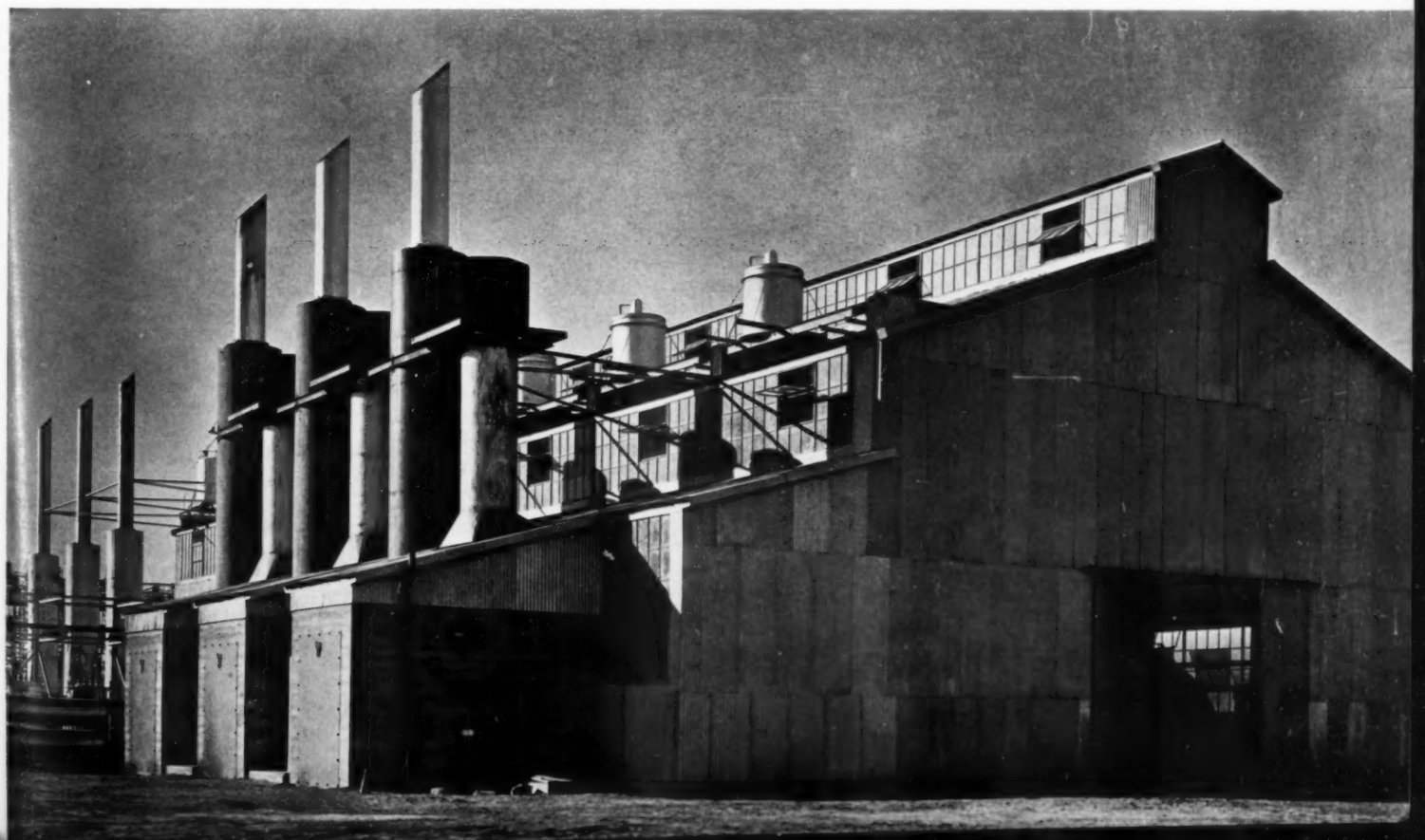


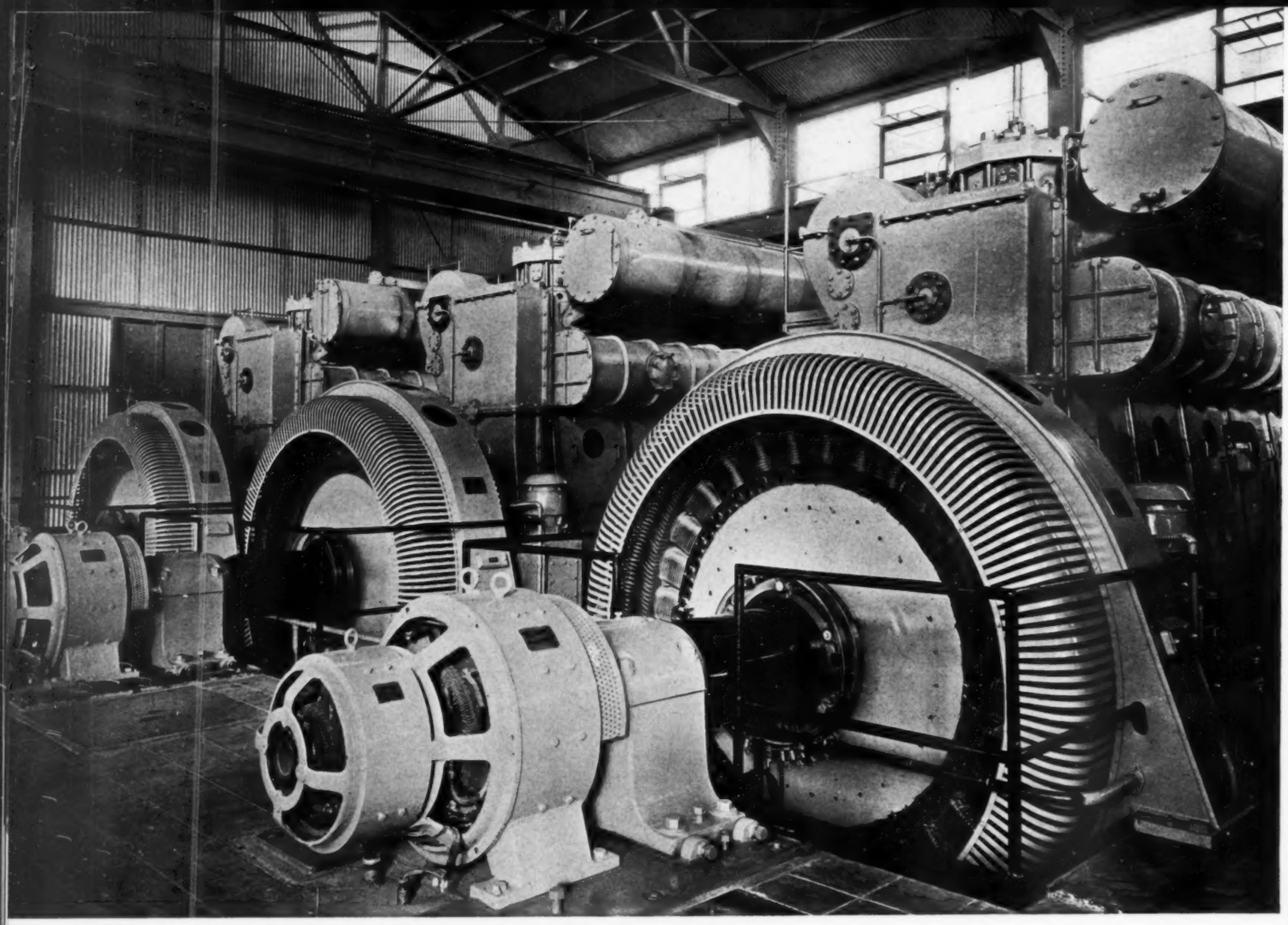
Marley cooling tower for three new engines at left and Braun tower for three original engines at right.

The three new units consist of Hamilton-M.A.N. 6-cylinder, 2-stroke-cycle, single-acting Diesel engines directly connected to 2,188-kva. General Electric generators. Each engine is rated at 2,300 hp. at 240 rpm. The cylinder bore is 21½ in.; the length of stroke 27½ in.; the mean piston speed 1,100 ft. per minute; the break mean effective pressure 63.22 pounds per sq. in.; the compression pressure 500 pounds per sq. in., and the maximum post ignition pressure is 750 pounds per sq. in.

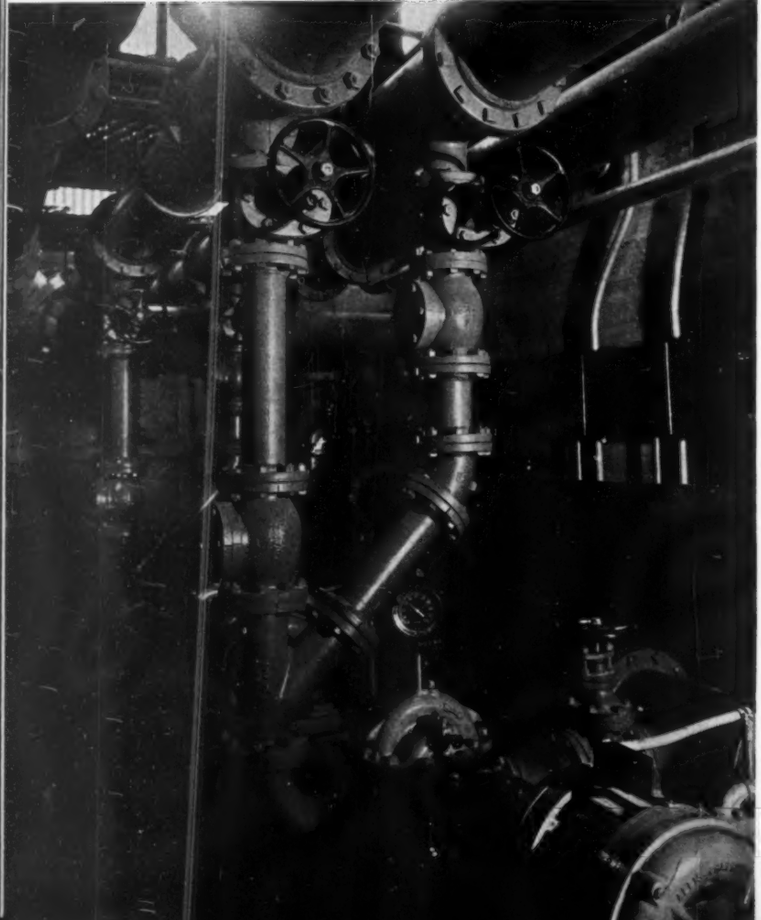
The engines are equipped with American Bosch fuel injection systems, Woodward governors, and Kinney attached lube-oil pumps. The pistons are oil cooled through telescopic-type tubes, and all cylinders are equipped with starting air valves. The cylinder lubricators are Manzel and are mounted on the side of the

General exterior view of the Brawley Diesel plant with Maxim silencers and American air filters for three new engines in foreground.





Generator end of the three new 6-cylinder Hamilton-M.A.N. engines illustrating the 2,188 kva. General Electric generators, with direct-connected exciters.



A corner of the accessory bay illustrating the wide use of Crane valves and fittings throughout this plant.

engine and driven from the main fuel pump cam shaft which runs full length of the engine.

The scavenging blowers are the Allis-Chalmers, single stage, single inlet type, and are directly driven by 250-hp., 3-phase, 60-cycle, 440-volt motors. They have a speed of 3550 rpm., a capacity of 11,000 cfm. each at 3.2 pounds per sq. in., and are equipped with butterfly valves on the discharge side to control the load during the starting period.

The intake filters are American hexagonal type, and are mounted on the tops of the Burgess intake silencers. The Maxim silencers are mounted vertically on top of the reinforced concrete scavenging blower vaults. With this arrangement of blowers, vaults, and silencer equipment, the noise of the blowers and the intake is so effectively reduced that it is perceptible for only a short distance from the plant.

The exhaust silencers are the Maxim welded type. They are vertical with end inlets and outlets, and are mounted on top of reinforced concrete exhaust pits. These pits are completely under ground except for the top slab, and therefore assist very appreciably in muffling the sound of the exhaust as well as providing suitable footing and anchorage for the silencers.

The exhaust lines from the engines enter the exhaust pits vertically and on the ends opposite the silencers. A manhole is provided in each pit midway between the exhaust line and the silencer and provides access for inspection.

The engine cooling system is the closed type, using treated water for jacket cooling and raw untreated water on the cooling tower side. Braun heat exchangers are used on both the lube oil and the jacket-water cooling.

Each of the three lube-oil coolers has a capacity sufficient to cool 385 gallon of oil per minute from 146.2°F. to 124°F., using 266 gallons of water per minute with inlet temperature of 99°F. and outlet temperature of 114°F. The lube-oil coolers are located on the engine floor level and above the basement.

Each of the three jacket-water coolers has a capacity sufficient to cool 575 gallons of soft water per minute from 150°F. to 136°F., using 533 gallons of raw water per minute with inlet temperature of 99°F. and outlet temperature of 114°F. The jacket-water coolers are mounted on concrete piers outside the building.

Due to the excessive temperatures and humidity conditions which occur during the months of June, July, and August, it was found that the atmospheric type of cooling tower installed with the first three engines was not entirely practical. Records show that a dry bulb temperature of 119°F., a wet bulb temperature of 90°F., and an air movement of one mile per hour frequently occur at the same time. Under these conditions the atmospheric tower ceases to operate or is so erratic that it is impossible to control the temperatures. To make this condition worse, the air-conditioning load in the valley is also at its peak due to the temperature and humidity conditions, and thus combine to make cooling most difficult. For these reasons, it was found necessary to go to forced-draft cooling.

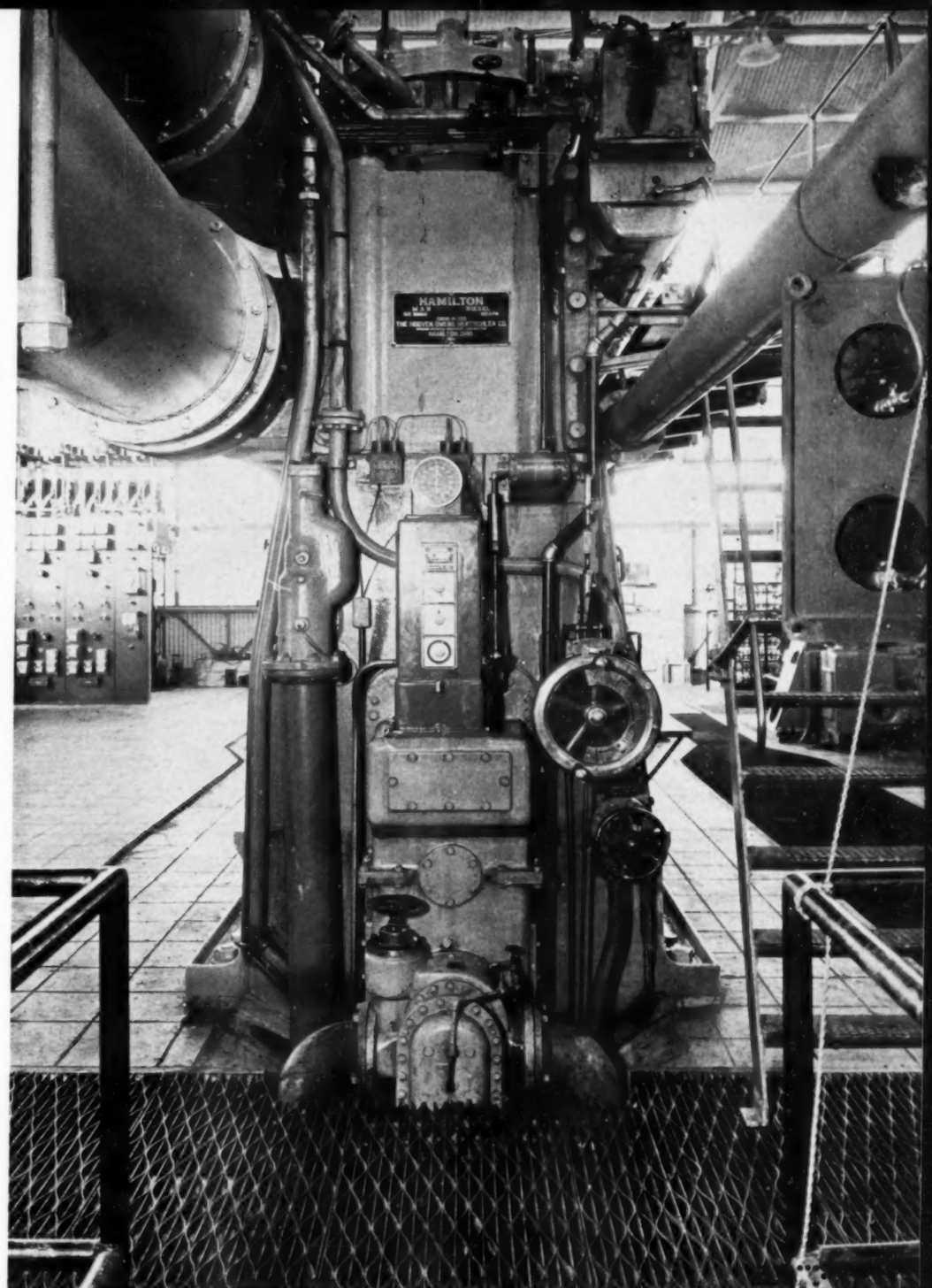
The cooling tower installed with the three new engines is The Marley three-compartment, forced-draft type. The body is double-cased and is constructed of redwood throughout. The spray system consists of two elevations of spray nozzles evenly distributed. No filler members are required.

Each of the sections is equipped with a multiple-blade fan, driven by a 10-hp., splash-proof motor through a reducer gear. Each fan has an air capacity of 9,300 cfm., with full head of water in the tower.

Under normal operation, each of the sections will cool 800 gallons per minute from 114°F. to 99°F. with a wet bulb temperature of 90°F. Each section also has an overload capacity of 900 gallons of water per minute from 115°F. to 100°F. with wet bulb temperature of 90°F.

The soft and raw-water, lube-oil and fuel-oil pumps, the centrifuge air compressor and other auxiliaries are located in the basement with water and oil headers running lengthwise of the building. The three soft-water pumps are Allis-Chalmers, double-suction, SK, centrifugal, horizontal, split type, each with a capacity of 575 gpm. at 100-ft. head. The three raw-water pumps are Allis-Chalmers, double suction, SH, centrifugal, horizontal, split type, each with a capacity of 600 gpm. at 75-ft. head. The motors on all six pumps are the low-starting-current type and are controlled by Cutler-Hammer across-the-line magnetic controllers with push-button stations at the motors.

The emergency lube-oil pump is the Schutte & Koerting, Herringbone-gear type, with ball-bearing-mounted rotor. It has a capacity of 385 gpm at 70 pounds per square inch. It is driven by a General Electric 20-hp. motor. The starter is the General Electric magnetic switch with overload and undervoltage control.



Operating end of one of the 6-cylinder Hamilton-M.A.N. Diesel engines, showing the Woodward governor and Kinney lubricating oil pump.

The three Purolator lube-oil filters are mounted in the basement on concrete slabs. They are the duplex type and each has a rating of 385 gpm. when used on 30 S.A.E. oil at 140° F. and 70 pounds per square inch in pressure. The filter elements are of wound bronze wire and remove all particles larger than .004 inches in diameter.

The lube-oil centrifuge is the Sharples En Bloc type. When operating on oil with a viscosity not greater than 770 seconds Saybolt Universal at 100° F. and a specific gravity of from 19° to 27° API at 60° F., it has an effective capacity rating of 400 gallons per hour. In order to avoid the corrosive effects of the Diesel fuel available in this area, the bowl is constructed of corrosion-resisting copper-nickel alloy.

The oil heating element has a capacity of 18,000 watts and is designed for 3-phase, 220-volt service. The bowl driving motor has a rating of 2 hp., and the pump motor a rating of ¾ hp., both operating on 220-volt, 3-phase, 60-cycle power. The motor and heater control is enclosed and mounted on the centrifuge as a unit.

The fuel-oil transfer pumps, one for each engine, are mounted on the basement floor and pump the oil to the 300-gallon day tanks on the roof of the building. These pumps are the Roper, positive displacement, bronze-fitted, rotary type, and each has a rating of 10 gpm. at 150 pounds per square inch pressure when operating on 70 sec. Saybolt Universal oil at 100° F. and with a specific gravity of 22° to 30° API.

General Electric voltage regulator rheostatic and high speed contactor unit.

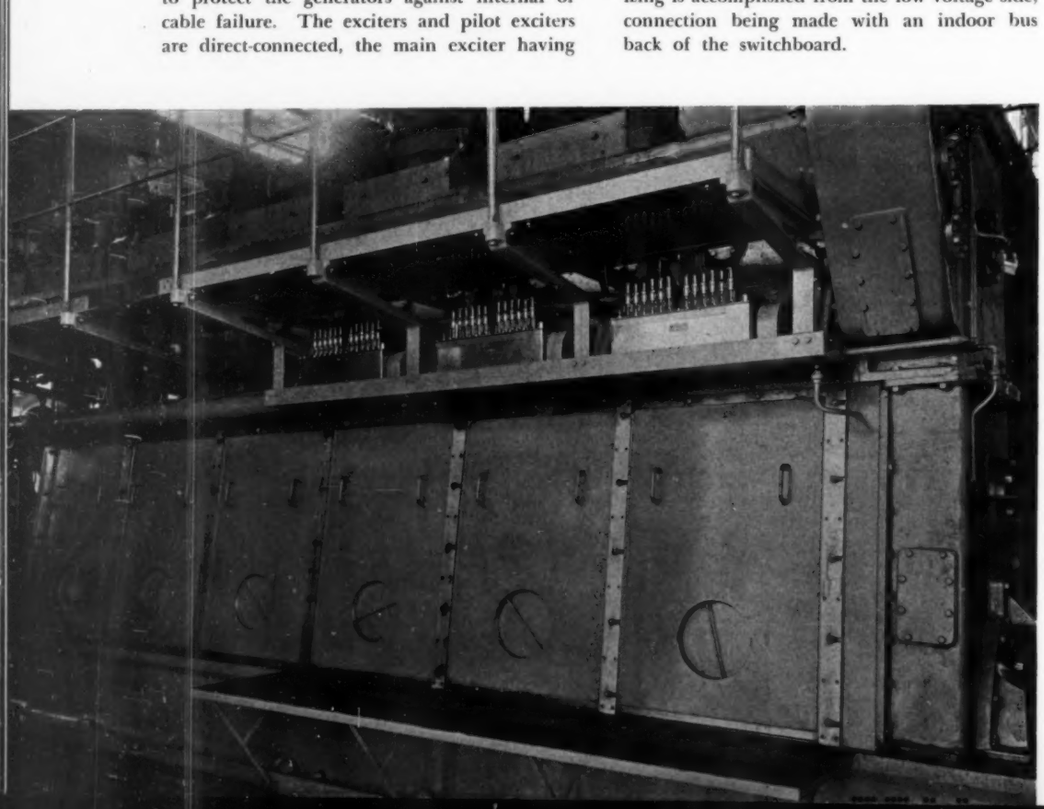
The three generators are the General Electric, and each has a rating of 2188 kva at 80 per cent pf., 4150 volts, 3-phase, 60 cycles and 240 rpm. All phase leads are brought out and the neutrals made up outside the generators. Differential protection is provided to protect the generators against internal or cable failure. The exciters and pilot exciters are direct-connected, the main exciter having a rating of 30 kw. at 125 volts, and the pilot exciter a rating of 3 kw. at 125 volts.

The voltage regulators are the General Electric type GFA-4. The voltage sensitive control units are mounted on the switchboard, and the field rheostats and high-speed contractor units are mounted on the engine room floor opposite their respective generators. Synchronizing is accomplished from the low voltage side, connection being made with an indoor bus back of the switchboard.

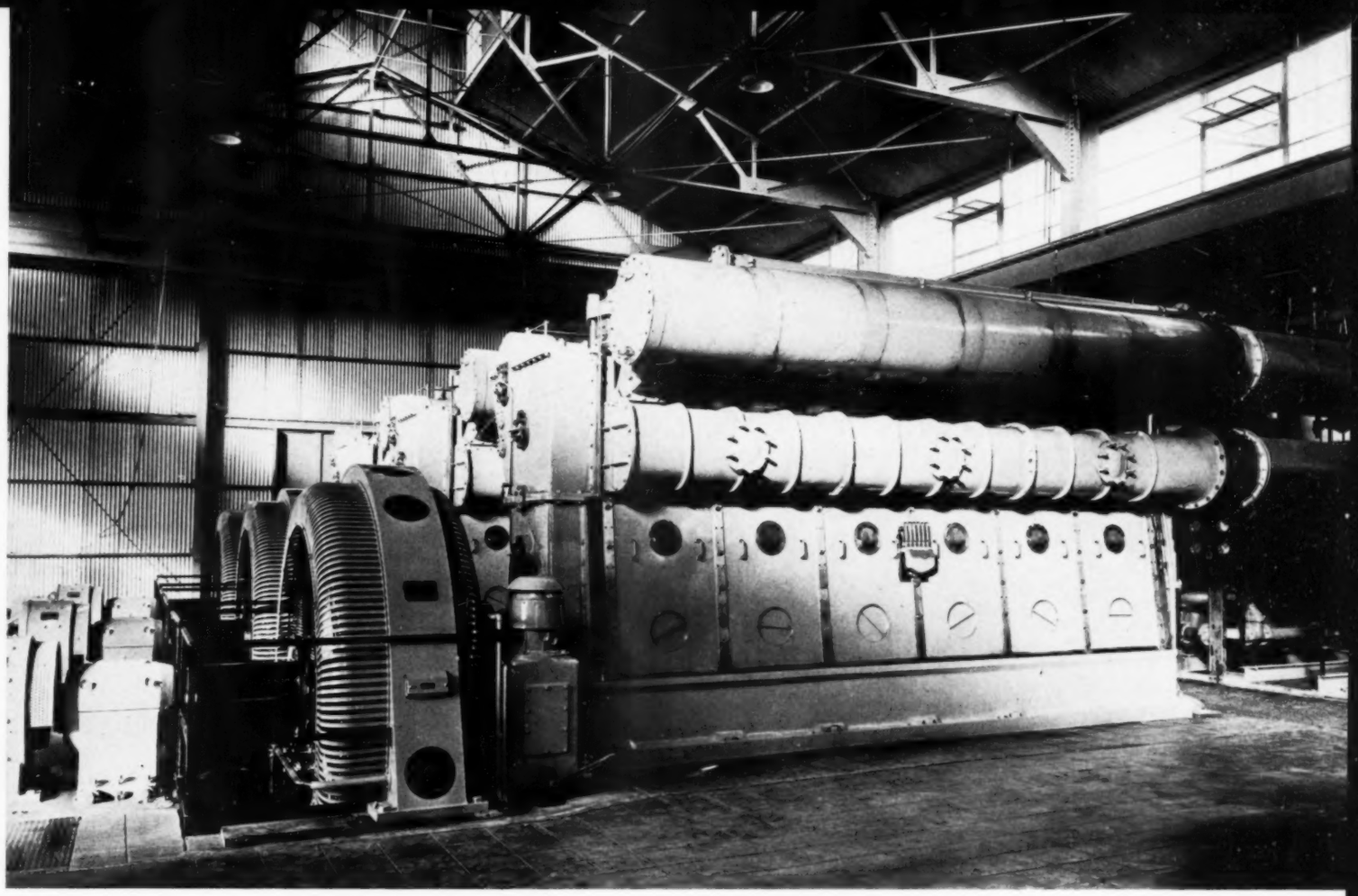
Additional accessories used throughout the plant consist of Niagara meters on all fuel lines, and Petrometer fuel gauges for each engine. A Wright ten ton hoist runs the full length of the building and is capable of handling the heaviest part likely to be moved either in a maintenance work or in erection. Crane valves are used throughout all six engines and accessories.

The building which encloses the new equipment is of structural steel with galvanized corrugated iron roofing and siding.

A contract has been recently signed with the General Machinery Corporation for the furnishing and installing of two additional units at the Brawley Diesel Plant in 1939. The new units will be of the same design as the six units now in service, except that each engine will have ten cylinders of the 21½-inch by 27½-in size and will have a rating of 4070 hp. The net capacity of each unit will be 2625 kw. at 80 per cent pf. With this addition, the net capacity of the Brawley Diesel Plant will be increased to 12,000 kw.



Lubricating side of one of the 6-cylinder Hamilton-M.A.N. Diesel engines showing the three Manzel force feed lubricators used on each engine.



General view of the three new 6-cylinder Hamilton-M.A.N. Diesel engines in the Brawley plant.

A FEW COMMENTS — *By* REX W. WADMAN

MR. DOWD is to be congratulated on writing a very clear, understandable article on this outstanding Diesel plant. In my opinion, he is a trifle modest in his description. I have spent considerable time in this plant and I want to go on record as stating that I consider the Brawley Diesel plant one of the most practical I have ever visited. No frills, no furbelows — just a workmanlike job of installation enabling the operating crew to get the maximum service from the engines with the least amount, might I say, of unnecessary work. Hearty congratulations are due to Mr. Dowd and his engineering associates on the very simple, yet effective plant layout they have achieved.

At this point it might be of interest to our readers to say a few words about the engines themselves. As stated, the plant consists of three 3-cylinder engines and three 6-cylinder engines, and they have on order a pair of 10-cylinder engines, so that when these two 10-cylinder units are installed, the plant will have 47 cylinders all of the same size; namely, 21½" x 27½", which I think is a record in this country and, to the best of my knowledge, a record for the world.

The Hooven, Owens, Rentschler Co., Division of General Machinery Corp., has developed this 21½" x 27½" single-acting 2-cycle Hamilton-M.A.N. Diesel engine for stationery service to cover a range from 1,000 to 2,500 kw. capacity, minimum rating, with an engine speed of 240 rpm. and with a number of cylinders varying from 4 for a 1,000 kw. unit to 10 cylinders for 2,500 kw. unit, minimum rating.

The general construction of the engine is simple and rugged. The cylinder blocks are made in units of two or three. For a 6-cylinder engine, two blocks are used, 3 cylinders in a block. These are bolted together forming a solid top girder, giving added stiffness to the whole engine structure. Cylinders are carried on A frames, bolted to the bed plate. Steel tie bolts carry the combustion load and extend from bottom of the bed plate to the top of the cylinder blocks. This arrangement forms rigid framing, relieving all tensile load from the cast iron structure which is thereby subject to compression load only.

On the valve gear side of the cylinder jackets are lantern openings which extend through the liner, enabling the operator to see the condition of the piston and rings without removal of cylinder head and pulling the piston.

Scavenging system is the well-known M.A.N. loop system with scavenging air entering into cylinder through-ports located well below exhaust ports. Both scavenging and exhaust ports are located on the same side of the cylinder. Air entering through the scavenging air ports sweeps across the cylinder, then upward toward the cylinder head and finally flows downward to the exhaust ports, making a complete loop and forcing the burnt gases out into the exhaust piping. Due to the shape of the scavenging ports, the air is given a circular motion which persists during compression to give a thorough mixing of air and fuel. Due to efficient scavenging a high mechanical efficiency and remarkably low fuel consumption is obtained.

Satco lined bearings are used for main bearings, crank pin bearings, wrist pin bearings, and camshaft bearings. The main bearing shells are arranged to be rolled out without removing the crank shaft.

DIESEL DREDGE "GENERAL CHITTENDEN"

By REX W. WADMAN

THE new 12 in. cutter head Diesel dredge *General Chittenden* was designed and built by the mechanical engineering staff of the district office of the U. S. Engineer Department at Omaha, Nebraska, and was commissioned August 15, 1938. The general design follows conventional dredge practice, with special attention given to location of machinery and equipment for maximum accessibility and ease of maintenance.

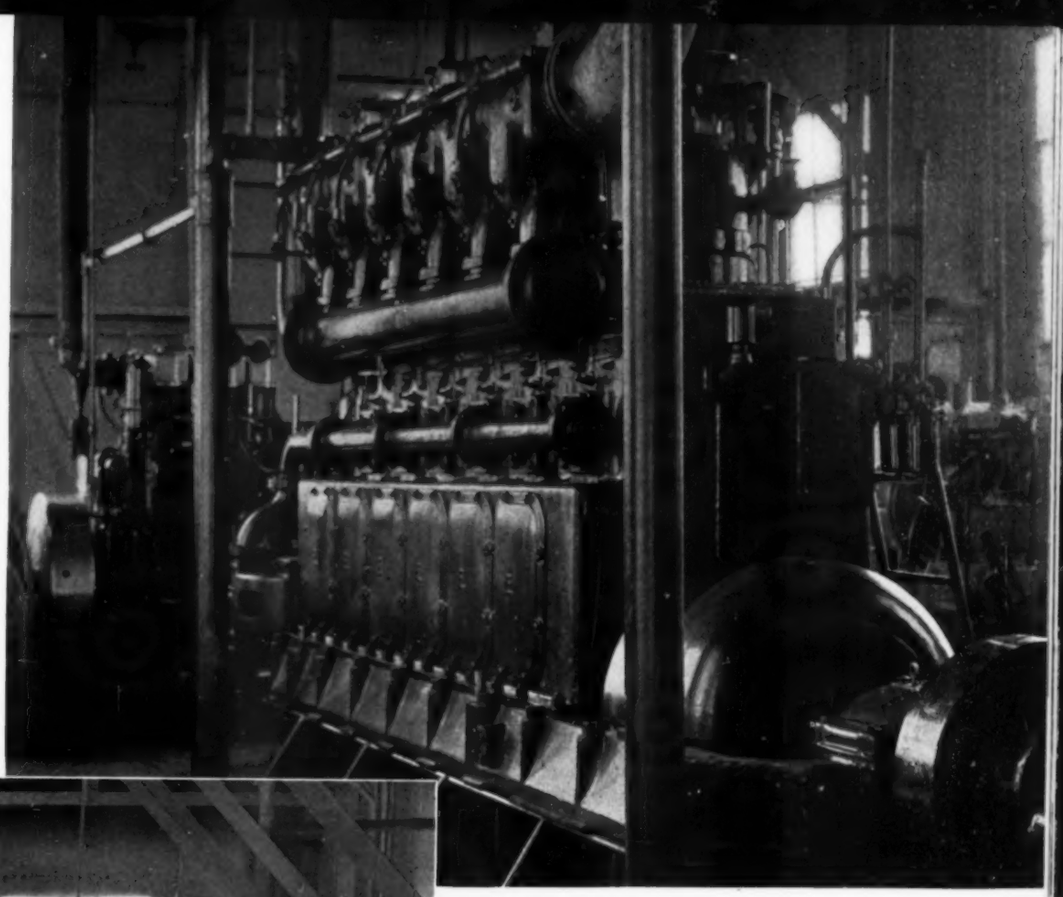
The hull is constructed of steel and has a length of 90 ft., width of 26 ft., and depth of 4½ ft., and is reinforced by three full length longitudinal trusses. Transverse bulkheads divide the hull into four water-tight compartments. The aft compartment is used for storage of reserve, clear, engine-cooling water. Four cylindrical tanks in the hull provide for 2,400 gal. of fuel oil supply. The cabin frame is of structural steel and is sided and roofed with 16 gauge steel sheets welded to the frame. Windows have steel sash.

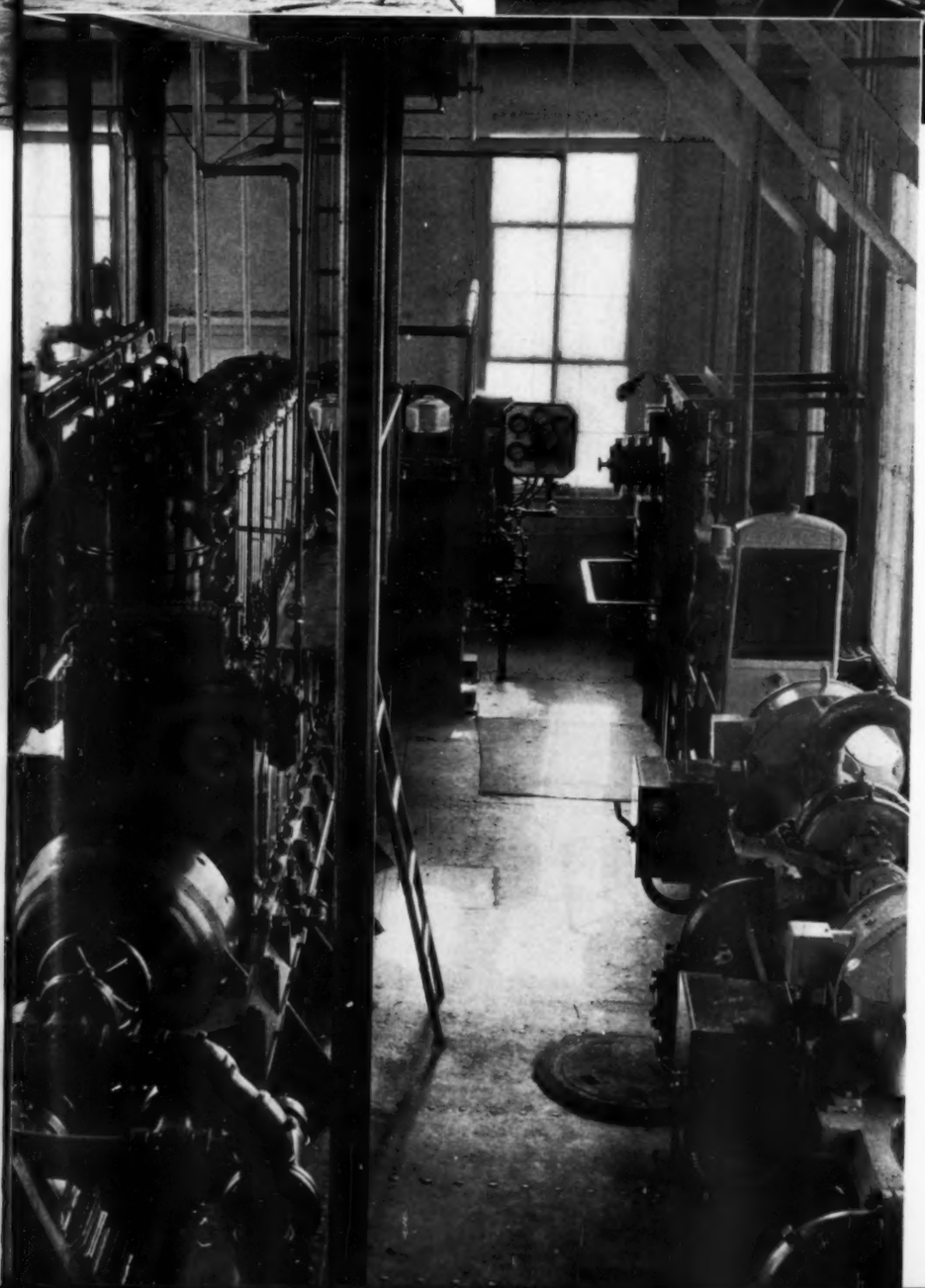
The cutter ladder is 35 ft. long from hinges to end of cutter. The cutter is a 6-blade, rose-pattern manganese steel casting 4 ft. 2 in. diameter and is driven by a 50 hp. Westinghouse Type FD-131-SK gear motor, with Westinghouse control. A length of heavy reinforced rubber suction hose serves as a flexible connection between ladder and dredge and has proven quite satisfactory. Coupling between gear motor and shaft was furnished by Falk. A Goodrich Cutless bearing is used in ladder terminal casting. Speed of cutter shaft is 15 to 30 rpm.

The hoist is a standard 5-drum dredge hoist supplied by Clyde Iron Works, Duluth, Minn. It is driven by a 20 hp. General Electric motor with G-E controller, giving a rope speed of 20 to 45 ft. per minute. Hoist control lever bank is mounted in pilot house, directly above hoist, thereby giving the operator an unobstructed view in all directions.

The main pump Diesel engine is a 6-cylinder Model D.M.G. Enterprise arranged for direct connection to the dredge pump through a Westinghouse Type C coupling. Bore is 12 in., stroke 15 in. Normal horsepower rating, 320 at 350 rpm. The engine accessories on both the main and auxiliary Enterprise engines consist of: Purolator fuel and oil filters, Harrison lubricating oil cooler, a Coppus air cleaner, a Brown pyrometer, and Viking safety alarm system. A Woodward governor is installed on the 8″ x 10″ auxiliary engine.

Electric power operates all auxiliary machinery by direct current, and is furnished by a 100 kw., 125-250 v. General Electric generator, direct-connected to a 6-cylinder Model D.S.L. Enter-





Above, main pump engine, Enterprise 6-cylinder, 320 hp., with 6-cylinder 160 hp. Enterprise auxiliary engine in background. At left, general view of engine room with pump engine in foreground and auxiliary engine in the rear.

prise Diesel engine. Bore is 8 in., stroke 10 in. Normal horsepower rating is 160 at 575 rpm. A single Schutte Koerting heat exchanger serves both engines. Raw cooling water for the exchanger is supplied by a 4 in. Gardner-Denver centrifugal motor-driven pump.

The dredge pump has 12 in. discharge and 14 in. suction openings and was manufactured by Ellicott Machine Corp. of Baltimore, Maryland, following standard Engineer Department dredge pump design. The pump shell, impeller, and heads are of cast steel. Both heads are fitted with renewable rolled alloy steel liners, and provision is made for reducing wear on liners by introducing water under high pressure between heads and impeller shrouds to flush out sand. A Kingsbury thrust bearing is employed.

A 5 kw. Kohler auxiliary light plant is used to supply electric current for lights and power tools when dredge is shut down. During cold months, heat is supplied by an American Radiator Co. Red Flash, oil-fired steam boiler, and Fedders unit heaters. Water for sanitary and drinking purposes is provided by an automatic electric pump and filter system. Drinking water is cooled by a Copeland electric water cooler.

DIESEL AVIATION

Front view of the 320/340 hp. Guiberson A-1020 aircraft Diesel.

THE NEW GUIBERSON A-1020 AIRCRAFT DIESEL

By ORVILLE ADAMS and PAUL H. WILKINSON

AFTER ten years of uninterrupted research and development work costing many hundreds of thousands of dollars, the Guiberson A-1020 Diesel aircraft engine is now available for service. The evolution of the design and the perfection of the mechanical details represent the result of many thousands of hours of test runs with a series of engine types. The new power plant represents the most extensive and advanced development so far made in the United States in this field. It can well be called America's first modern aircraft Diesel.

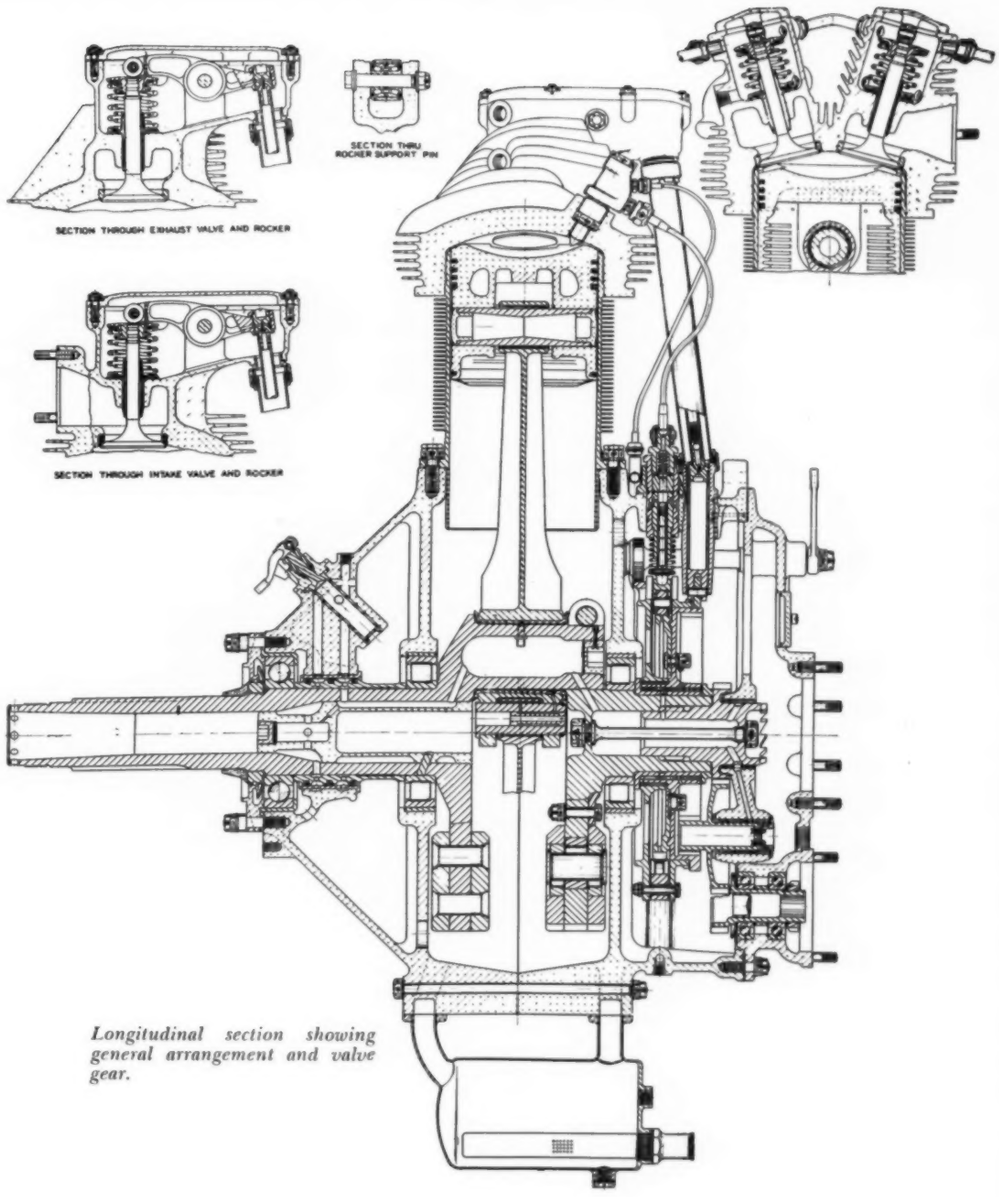
The Guiberson A-1020, as it is today, embodies only sound construction practice. Novel features are entirely absent. As is shown in the cross-sectional views, it is a strictly conventional 9-cylinder, air-cooled radial of the 4-cycle and 2-valve type. The combustion chamber, of the open type, is formed by the dome of the cylinder head and the concave surface of the piston crown. It can be classed as a quiescent combustion chamber in which no attempt is made to induce turbulence, the chief end sought being the greatest volumetric efficiency and the highest means effective pressure. Such a combustion chamber is essential for low fuel consumption and easy starting without using heater plugs at temperatures as low as 32°F., which are essential requirements for aviation.

The Guiberson A-1020 has a bore and stroke of 5.125 in. and 5.500 in., and a displacement of 1,021 cu. in. Operating at a compression ratio of 15:1, it has a rated power output of 320 hp. at 2,200 rpm., with 340 hp. at 2,250 rpm. available for take-off. This is equivalent to 31.3 hp. per 100 cu. in. of displacement, and a B.M.E.P. of 113 lb. per sq. in. at rated horsepower. It has a fuel consumption of 0.38 lb. per hp. per hour at full rated power, and when cruising at 190 hp. at 1,800 rpm., the fuel consumption drops to 0.34 lb. per hp. per hour. The engine has a diameter of 47 in., and weighs 620 lb., or 1.94 lb. per rated hp.

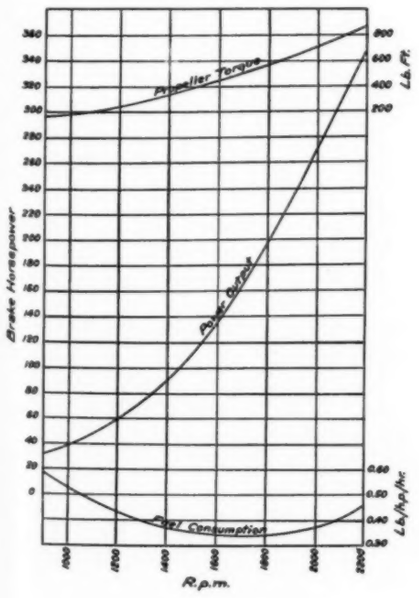
The aluminum alloy crankcase is in two parts bolted together on the center line. It supports the crankshaft in roller bearings of large diameter, with a ball thrust bearing to take the propeller loads. The rear part of the crankcase contains the valve tappet guides and the fuel injection pumps, the latter being located so that they connect with a fuel duct bored in the rear part of the crankcase.

The cylinders have forged steel barrels with short cooling fins, with aluminum alloy heads screwed and shrunk in place. The cylinder bores are honed to extreme limits of mirror-like finish. The valve seats, which are of Silcrome and aluminum bronze, are shrunk in the cylinder heads.

The pistons are made of heat-treated aluminum alloy with three compression rings, and one oil ring above and one below the piston pin. The latter is of the full floating type and is positioned by aluminum alloy plugs at each end.



Longitudinal section showing general arrangement and valve gear.

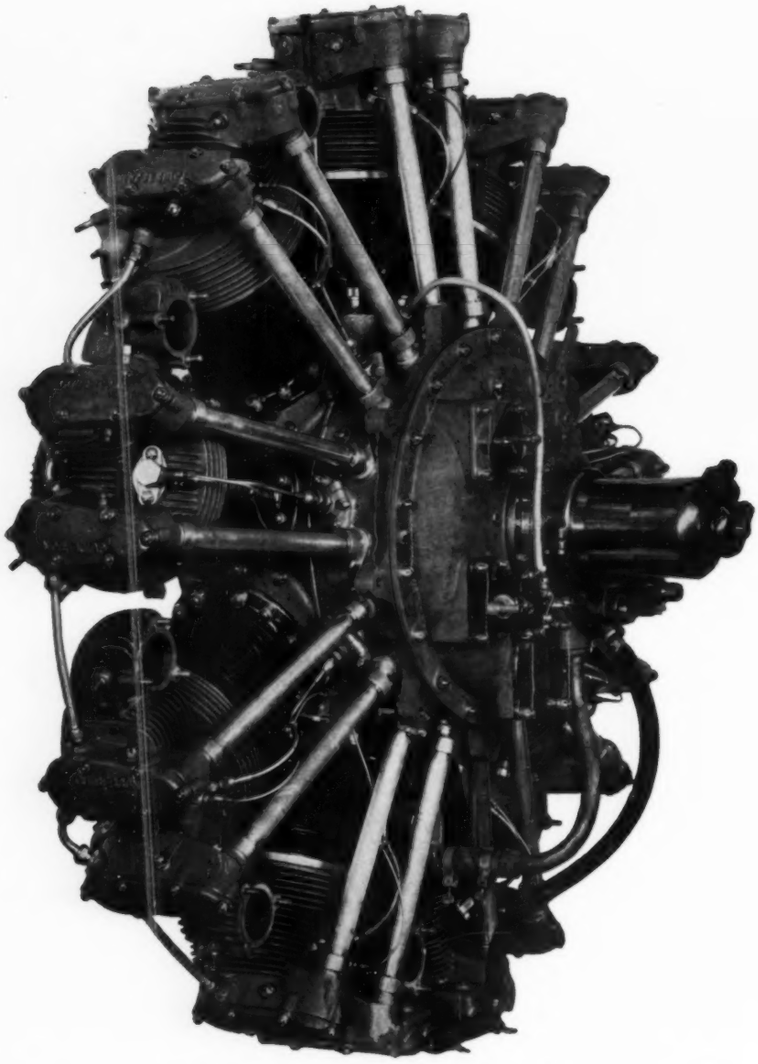


Propeller torque, power output and fuel consumption curves for the Guiberson A-1020 engine.

The master rod is of H-section alloy steel, and is heat-treated and machined all over. The crankpin bearing is of the steel-backed, lead bronze bushing type. The link rods are of tubular section and are machined to a polished finish. The single-throw crankshaft consists of a two-piece, heat-treated steel forging (S.A.E. 2512), drilled for lightness and plugged to form oil passages.

The valve cam ring is of forged steel, machined and hardened. The inlet and exhaust cams are unified in one lobe for the valve action, this being known as a monorail cam with four lobes on the cam ring. The latter is carried on a duro bronze bushing having the cam drive integral with the cam ring which turns at one-eighth engine speed in the opposite direction to the crankshaft.

The fuel cam ring is of heat-treated forged steel, and is secured to the valve cam by four mounting bolts with slots for adjustment. A fuel cam adjustment eccentric extends through the valve cam for adjusting the fuel cam ring. The roller tappets for valve actuation fit in aluminum alloy guides with threaded sections for receiving the push rod housing nut. The push rods are made of light steel tubing, and have hardened and ground pressed-in ball ends. The rods are fully enclosed, with their ball ends fitting in adjustable sockets at the rear end of the valve rockers. Each rocker arm is mounted on a Timken roller bearing, and this mechanism is also enclosed.



Rear view of the Guiberson A-1020 Diesel showing Coffman cartridge starter and accessories

The push rod housing tube is in one piece, flanged at the end. The push rod housing nipple pressed into the rear of the rocker box receives the straight end of the push rod tube. Push rod housing nuts retain a packing ring which securely seals the push rod housing assembly against dust and oil leaks.

The accessory housing comprises an aluminum alloy casting which is attached to the rear of the crankcase and contains the accessory gear train. It also carries the oil pump, the oil pressure relief valve, the throttle control shaft and the oil outlet connections. Above the starter flange is an inspection plate which can be removed for adjusting the fuel cam ring. Drilled ducts for the lubricating oil are provided from the pressure pump to the crankshaft and the intermediate gear bushings. A cored duct is incorporated for the by-passed oil and the scavenged oil from the scavenge pump.

Oil is delivered under pressure to all the drive bearings through drilled passages and through the crankshaft to the valve cam, the decompression plate, the crankpin and the knuckle pin bearings. The cylinder walls, main roller bearings, crankshaft thrust bearings, piston pins and fuel pump lifters, are lubricated by splash. The oil pump is of the gear type. The scavenge pump picks up the excess oil in the crankcase sump and returns it to the oil tank. The oil pressure relief valve is set for a minimum pressure of 85 lb. per sq. in. at an engine speed of 2,000 rpm.

The fuel injection system comprises nine individual fuel injection pumps of the Guiberson vacuum type which were specially developed to eliminate the need for a governor or other complicated mechanism which adds weight. The pumps are noted for their simplicity and reliability in operation, as will be readily appreciated from their action.

When the fuel plunger is at the bottom of its stroke, the inlet port in the pump housing is uncovered and fuel flows into the barrel above the plunger aided by a partial vacuum created during the down stroke of the plunger. On its upward stroke, the plunger forces the surplus fuel out through the inlet port until it reaches its cut-off position, when it covers the port. Fuel compression and injection then take place while the plunger moves upward until the latter reaches its release position, when the fuel can by-pass through a hole in the upper portion of the plunger via an annular groove around the latter into the inlet port. This releases the pressure and injection ends, while the plunger continues ineffectively to the end of its stroke. Such is the operation of the pump at full throttle.

With the throttle set in any intermediate position, the operation is the same except for the lowest plunger position. As the fuel inlet port is then only partially opened, it governs the amount of fuel admitted to the barrel above the plunger. This is particularly effective, since the time is limited in which the fuel can flow through the restricted inlet port. If the engine speed decreases at any particular throttle setting, the time that the fuel inlet port remains open is increased and, consequently, more fuel is admitted and the speed of the engine increases. When the engine speed increases unduly, this action is reversed. When the throttle is closed, the plunger does not uncover the inlet hole at all and as no fuel is injected, the engine stops.

The spring-loaded fuel injectors have triple-orifice nozzles, and spray the fuel fan-wise across the clearance space through three holes 0.014 in. in diameter radially disposed at an angle of approximately 55 degrees. The fuel is injected at a pressure of from 2,200 to 2,500 lb. per sq. in. It has a specific gravity of from 0.847 to 0.869 (32° to 38° A.P.I.), with a pour point of −10°F. and a viscosity of from 39 to 52 seconds Saybolt Universal at 100°F.

In addition to the Guiberson A-1020 aircraft Diesel, another model known as the T-1020, Series 3 (or Military Model), is available for automotive and vehicular purposes. The T-1020 engine is rated at 250 hp. and has a diameter of 44.875 in. Its construction is identical with that of the A-1020 engine.

Exterior view of the Municipal Diesel Plant at Georgetown, Texas.

GEORGETOWN, TEXAS

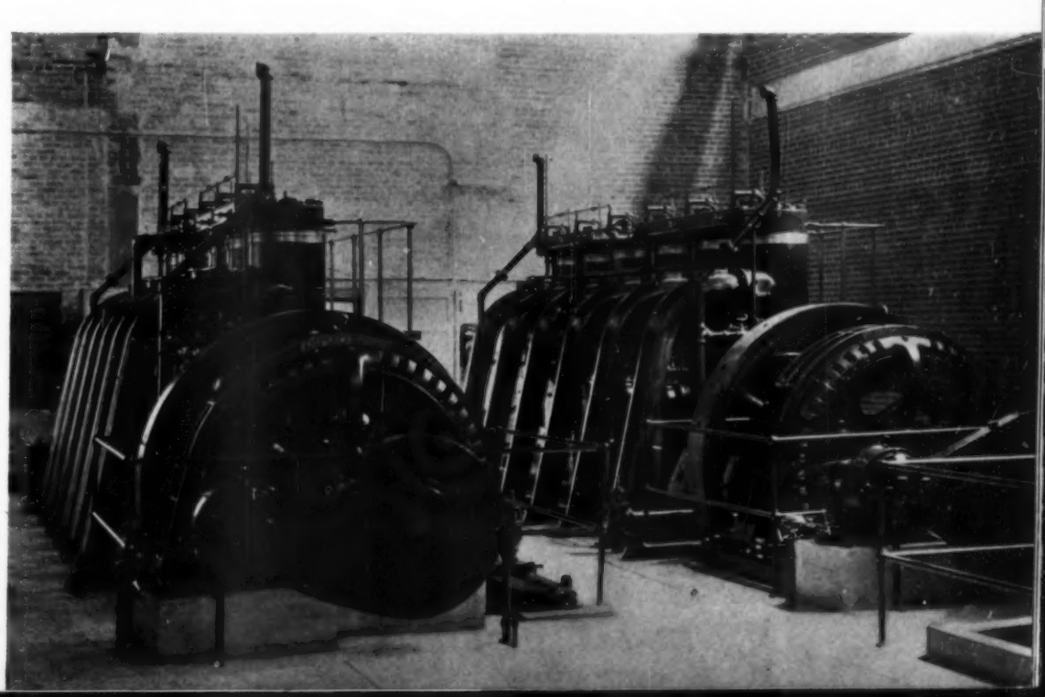
By ORVILLE ADAMS

A DECADE of experience with Diesel engine economy in municipal operation at Georgetown, a Central Texas city of 4,000 population, furnishes a basis of a "Diesel yardstick" now being used in this region for measuring the feasibility of this type of engine for the municipal service. Fought by competition at the outset and harrassed at every step in its progress, this municipal enterprise emerges after ten years as an example of good engineering and sound management.

Having replaced its old steam plant in 1929 with two 360 hp. Fairbanks-Morse Diesel engines, this city now owns its Diesel generating plant, power plant building and accessories valued at $110,000.00, and a ditsribution system valued at $60,000.00, values being based on first cost and additions less annual depreciation, and an outstanding debt of $45,000.00 of 3 per cent revenue bonds. Without any Federal loans or grants, the city is rapidly retiring the revenue bonds each year as shown on the table of revenue and disbursements.

With the recent installation of a new 750 hp. Fairbanks-Morse, 16″ x 20″ Diesel, the city has an installed capacity of 757 kw. operating at a load factor that produces 1,995,500 kwh. annually, produced on a total fuel consumption of 169,764 gallons of fuel oil, costing $6,579, and lubricating oil cost of $1,430, with only $550.00 for maintenance and supplies. For salaries and wages at the plant, the sum of $11,434.00 was paid out. The gross revenue was better than $50,000.00.

Mr. R. E. Ward, manager of the Light and Water Department publishes an annual report shown herewith, showing that the financial condition of this municipal Diesel plant is in a very healthy one. An interesting feature of this report is the revenue produced and used by the city for other purposes with a saving in taxation. "One fact frequently overlooked," says Mr. Ward, "is that the rate structure of a municipal plant has this element of revenue to be returned to the city that is not found in



Original pair of 360 hp. Fairbanks-Morse Diesel engines installed in 1929.

the rate setup of the power company serving a city." In line with a general practice of towns operating their own utilities, Mr. Ward has published each year a full report of receipts and disbursements featuring this element of profit to the city as a result of the operation.

Just how this works out, in comparison with power company rates, is shown by an analysis made by Mr. Ward of the rate structure and a breakdown of the disbursements to show the proportion of the rate necessary to return the amounts shown, and produce the revenue that the city enjoys.

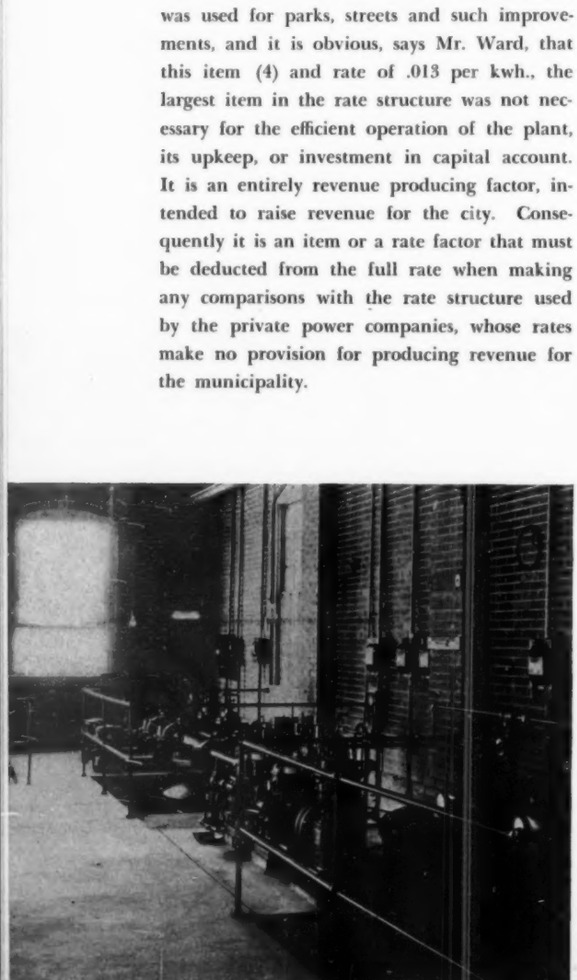
Revenue Analysis and Disbursements

Out of the total production, the city sold 1,111,000 kwh. and collected a gross revenue of $50,242.42 from the sale of light and power. The disbursement of this revenue was made as follows, and the rate factor necessary to cover each item of disbursement, expressed in cents and mills per kilowatt hour is given in the tabulation hereunder.

Rate Factor Applying to Disbursements

Salaries	$11,434.72	.01	(1)
Fuel and Oil	8,009.89	.007	(2)
Incidental Exp.	5,215.19	.004	(3)
Money Transferred to Fund	14,710.40	.013	(4)
Capital Investment	11,054.19	.01	(5)

The money transferred to the General Fund, was used for parks, streets and such improvements, and it is obvious, says Mr. Ward, that this item (4) and rate of .013 per kwh., the largest item in the rate structure was not necessary for the efficient operation of the plant, its upkeep, or investment in capital account. It is an entirely revenue producing factor, intended to raise revenue for the city. Consequently it is an item or a rate factor that must be deducted from the full rate when making any comparisons with the rate structure used by the private power companies, whose rates make no provision for producing revenue for the municipality.



The new 750 hp. 5-cylinder 16" x 20" Fairbanks-Morse Diesel installed in 1936.

Part of the auxiliary bay, showing in the center the two Goulds Hydroil centrifugals, one handling the fuel line and one handling the lubricating oil line.

Recently the Colorado Power Authority has been making vigorous effort to sell current to cities in Central Texas, resulting in frantic efforts by the power companies to work out competitive rates. Recently, a new rate was announced by the Texas Power and Light Company, for which claims were made in the newspapers to be lower than rates charged by municipal plants in Texas. In this connection, Mr. Ward recently pointed out when comparing rates in Georgetown with the new rates of the Texas Power and Light Company, that there is little or no difference in the final amount of money paid for service by the customer, in Georgetown and other cities served by the power company, on the new rate, compared with the rate in Georgetown for the past several years.

In discussing this point, Mr. Ward has shown that had the city of Georgetown purchased the highline service from the utility in 1937, however, with the number of customers quantity of current consumed, at rates then prevailing in the city, the citizens would have paid in taxes for the services indicated below:

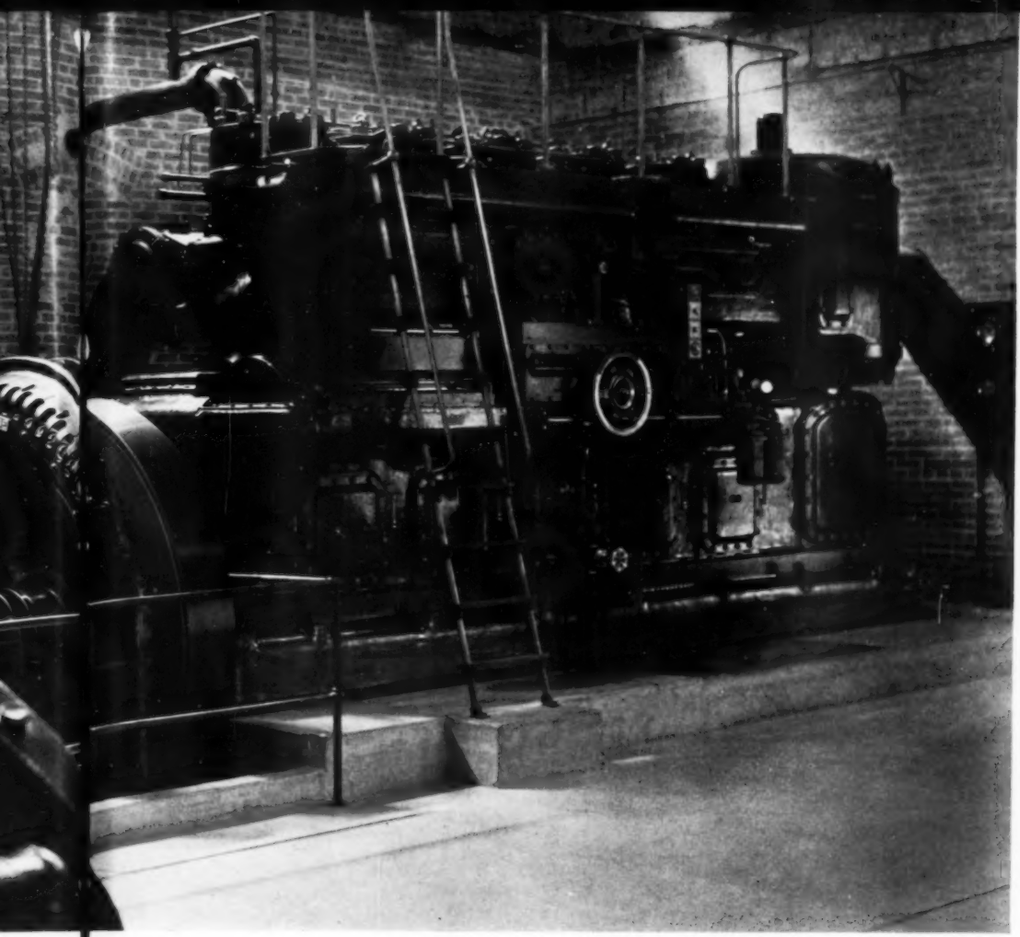
Street Lighting	$2,972.00	
Water Pumping	2,879.00	
Incidental Lighting	149.00	$6,000.00

which amount would have been collected in Georgetown in Taxes, and from private customers, the power company would have collected approximately $56,424.48 which is more than 12 per cent more than was actually collected by the city itself. For this the city would have received back in Taxes paid by the utility only $750.00.

On the other hand, the amount of $14,710.40 taken from the gross revenue and spent for Parks, streets, etc., would have been collected and taken out of the city by the utility. Then the matter of $11,054.00 collected and applied to the capital account by the city, would likewise have gone out of the city to increase the value of the power company's assets, instead of adding to the assets of the city of Georgetown. With municipal operation, however, this rate of .01 per kwh., a necessary part of the rate structure went to purchase betterments for the city.

Taxes and Municipal Operation

It was also shown by Mr. Ward that had the city been served by a private utility, there would have been no generating plant to employ men, but a high line, now about one mile from the city limits, a sub-station and connecting highlines, having a possible total taxable valuation of $100,000.00, which at a tax rate of $1.00 on three quarter valuation, would have produced in taxes for the city only $750.00. This would not go very far, Mr. Ward says on paying for the above bills for street lights and water pumping. In fact, he says, when we deduct this $750 from $6,000.00, we see that the taxpayers of Georgetown would need to dig up $5,250 in additional taxes to pay for these bills. "We are not interested in Taxes paid other government agencies," Mr. Ward says, "What we are interested in is the amount of money taken out of our city treasury for necessary electric service compared with the amount returned by taxation. The utilities claim they pay out 15 per cent of their gross revenue for taxation which means that we would have been taxed under private ownership for the benefit of other government agencies the amount of $8,467.50 and received only $750 back in the treasury. This looks like a bad deal to us." The city has its choice of having the rate for electric current increased



by this tax factor of the utility, or making its own power and be free of all these taxes. The taxes paid by the utility is taken out of the citizens pockets in the form of utility bills.

Rate structures mean little to the customer, Mr. Ward continues. What the customer wants to know is where his money goes. The utilities should make available a complete breakdown of receipts and expenditures, and give an analysis of its rate structure, so that the people will have the information by which to do their own figuring. Then there will be much less occasion for misleading information.

Constantly, improvements and refinements as well as additions have been made to keep the plant at Georgetown up to date. The fuel economy is as good as any in the state. Every essential auxiliary unit is used, and the adjuncts to efficient operation have been built.

The new 750 hp. Diesel engine is equipped with a full complement of auxiliaries, which include pyrometers, silencer, centrifuges, air filters and an isochronous governor.

The centrifuges, both Hydroil, one for the fuel, and one for the lubricating oil, operating on the continuous by-pass system, are included. The lubricating oil is continuously cooled by means of a Schutte-Koerting shell and tube cooler. In addition to the regular filtering equipment, the lubricating oil is also passed through a Nugent Duplex oil strainer. The intake air is filtered through a bank of American Air filters, consisting of nine cells or units, the filter elements being the impingement type. The exhaust from the exhaust header is direct through an 18" Maxim, DO-4 silencer, mounted on the outside of the building. Air filters are also installed outside and they are housed in rain-proof compartments.

The exhaust temperature indicating pyrometer is a Brown instrument, mounted on the wall instrument panel. On the instrument board are also mounted the scavenging air pressure guage, the oil pressure guage and the water pressure indicator, in connection with a low water alarm instrument. The Woodward Governor is mounted on the engine fuel pump end, with the usual switchboard connections. The electrical equipment, comprising generator, exciter and the like, are furnished by the Engine builder. An alternator having a 646 Kva capacity is rated at 517 kw. and 2,400 volts at 257 rpm. The exciter is a 15 kw. unit, v-belt driven from the generator shaft at 1,540 rpm. The starting system, including a two-stage air compressor is v-belt driven by a Fairbanks-Morse motor, and air tanks, are likewise mounted in the auxiliary room.

REPORT GEORGETOWN WATER & LIGHT PLANT FOR 1937

Cash Receipts		
Water	$17,115.75	
Lights and Power	50,424.42	
Sewerage	7,039.19	
Mdse	317.62	
Received Misc.—Sources	520.09	
Cash on hand Dec. 31, 1936	2,775.44	
Total Cash		$78,192.51
Disbursements—*Operating*		
Fuel Oil	$ 6,579.33	
Lube Oil	1,430.56	
Salaries	11,434.75	
Waste & Packing	140.58	
Insurance	1,010.36	
Water Operation	6,853.01	
Light Operation	5,215.19	
Sewer Operation	399.25	
	$33,063.03	
Other Expenditures		
Water & Light Extensions	$15,746.15	
Sewer Extensions	1,351.98	
Water & Light Replacement	173.52	
Mdse	9.71	
Lamps for City	594.34	
Street Department	6,433.07	
Park Department	11,710.40	
Int. and Sinking Fund Rev. Bds	7,200.00	
Int. Sinking Fund	326.63	
Labor Fire Depart	102.00	
Misc. Sources	118.03	
		76,828.86
Cash on hand December 31, 1937		1,363.65
Income Above Expense of Operation:		
Water & Light Extensions		$15,746.15
Sewer Extensions		1,351.98
Street Department		6,433.07
Park Department		11,710.40
1937 Book Accounts		6,705.71
Cash on hand December 31, 1937		1,363.65
Interest and Sinking Fund Revenue Bonds		7,200.00
Interest and Sinking Fund		326.63
Labor Fire Department		102.00
		$50,939.59
Less:		
Book Accounts, 1936	$ 7,008.87	
Cash on hand December 31, 1936	2,775.44	
Water & Light Replacement	173.52	
		50,939.59
Total Net Income above operation	$ 9,957.83	$40,981.76
Free Service Furnished City:		
Water for 70 Fire Hydrants 33⅓	$ 2,333.00	
Current for 213 Street Lights @ $15.00	3,195.00	
Chamber Commerce Water & Lights	30.00	
Water for Fountain	60.00	
Relief Office & Sewing Room	58.02	
Water & Light Fire Hall	350.52	
Water for Parks	150.00	
Park & Outdoor Lights	972.00	
		7,148.54
Total Net Income		$48,130.30
Sewerage Report for 1937:		
Cash Receipts		$ 7,039.19
Operation	$ 399.25	
Supervision & Bookkeeping	480.00	
	$ 879.25	
Net receipts above expenditure of the year		$ 6,159.94

DIESEL DUMP TRUCKS

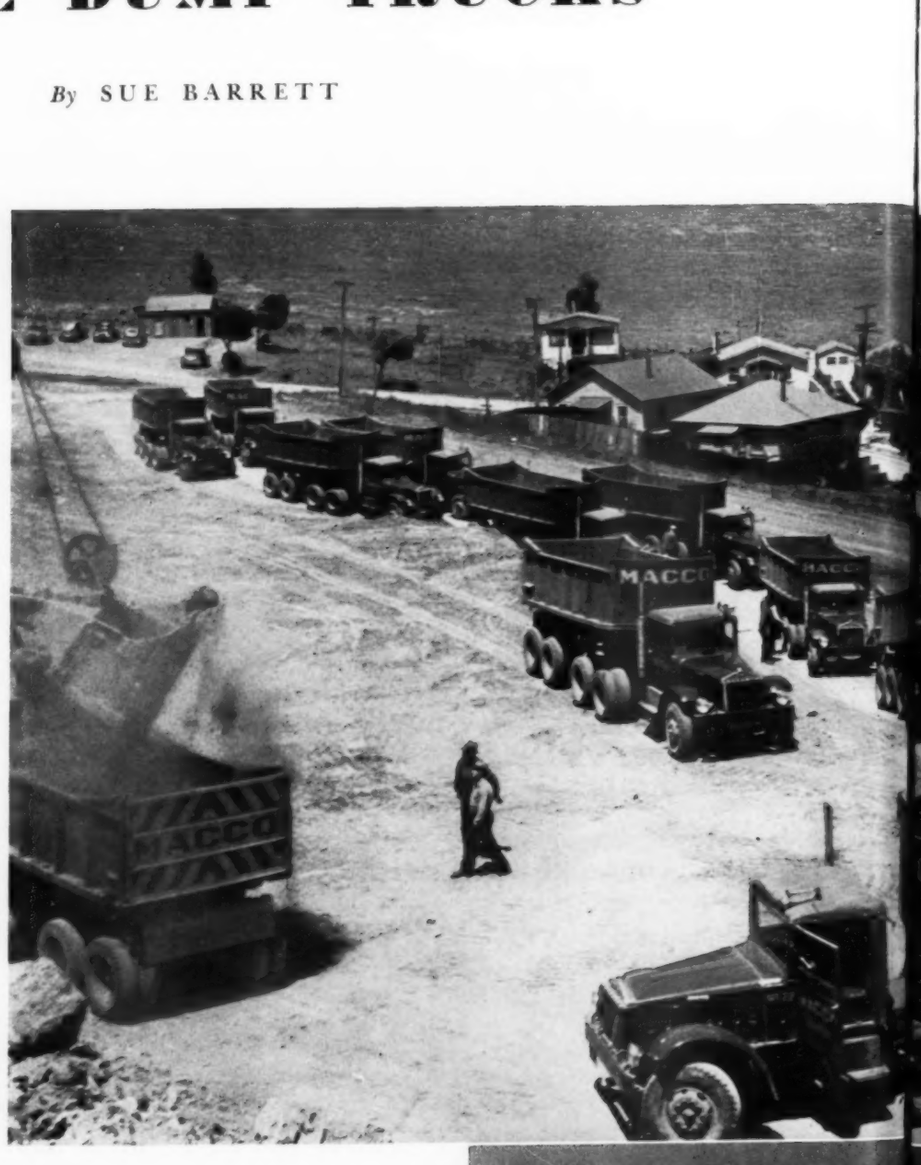
By SUE BARRETT

SOME uninformed individuals, with prejudiced minds, always throw stones under the wheels of progress during the development of a startling improvement over the old regime. Such a bogey was placed on the application of Diesel motors to dump truck service by those whose interest might be in jeopardy. To the skeptical-minded, the following cases are cited in proof of the supremacy of Diesel power to move dirt:

When Macco Construction Company of Clearwater, California, was awarded the contract to build the San Francisco Municipal Air Port Extension, they were faced with a serious transportation problem: the material quarry was located four miles from the airport on the Bay Shore Highway, restricting transportation equipment to such as could comply with California State Highway Laws on weight, size, and speed. With approximately 1,000,000 cu. yds. of material to be quarried and hauled four to six miles within ten months, it was imperative that this company procure the finest equipment possible to insure completion of this contract within time limits.

After careful investigation of the equipment available, twelve Sterling dual chain, four-wheel drive Diesel tractors and Fruehauf semi-trailers, equipped with Heil dual telescopic straddle mounted hoist with 16 cu. yd. water level bodies, were purchased. Substantiating their judgment in selecting this equipment, the author would say that this work is five-seventh completed in five months, with every indication that the entire contract will be finished three months ahead of schedule. Loading at the quarry is done by a 3 cu. yd. Northwest Diesel-powered shovel, working three 6-hour shifts, five days per week. A Caterpillar Diesel-powered bulldozer places the dirt and rock on the fill—a Caterpillar Diesel-powered road maintainer keeps the roads in shape at the quarry and on the fill.

The performance of these Diesel-powered units has exceeded the forecast of purveyors: each unit averages more than 300 miles per working day, which is quite remarkable since 3½ miles of this route is on the famous Bay Shore Highway, one of the busiest of traffic arteries. A speed of 40 mph. is maintained without damage to the Cummins Diesel motors. This speed is permitted to avoid traffic congestion on this busy highway. A 25 per cent grade for 600 feet of the road from the quarry to the highway is used, which demonstrates the safety and efficiency of Westinghouse air brakes on this equipment. Mr. John MacLeod is president and Mr. Ben F. Wells is general superintendent of the Macco Construction Company.



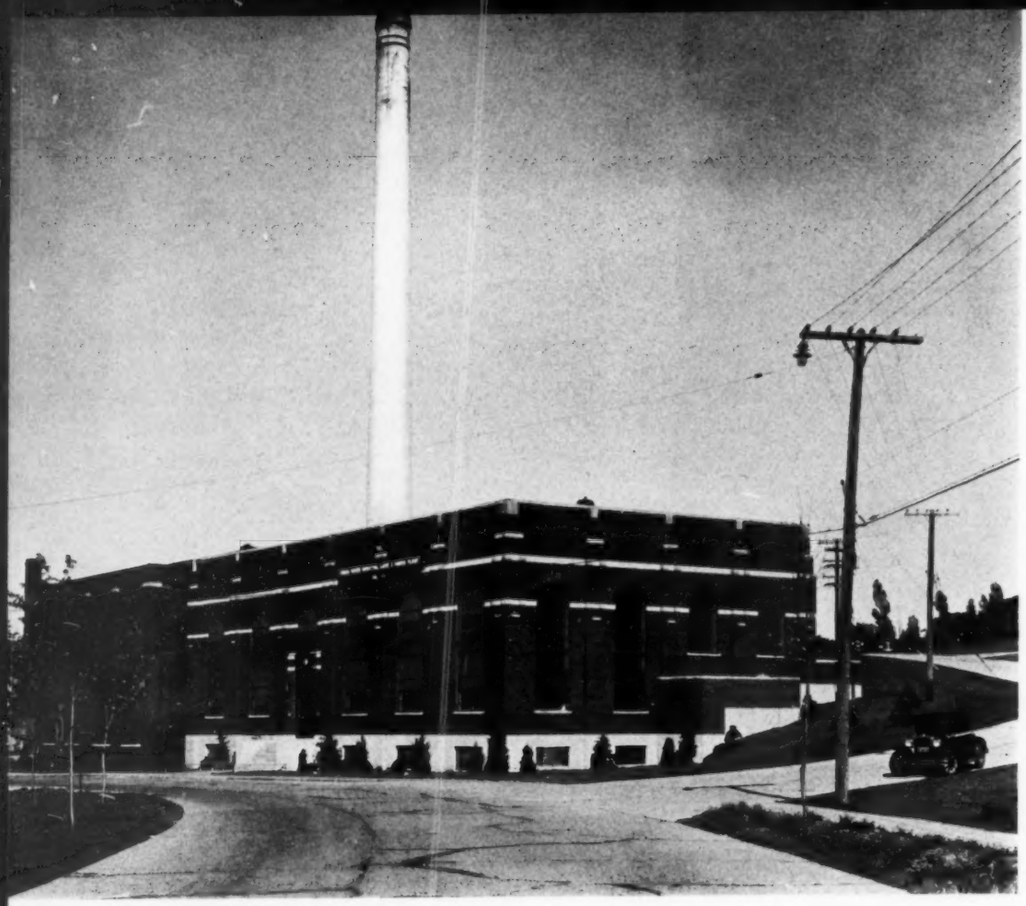
The Indian Reservation Dam at Headgate Rock on the Colorado River near Parker, Arizona, presented other serious transportation difficulties for the Rohl-Connolly Company, general contractors. Desert heat up to 125 degrees, deep sand, and dust storms handicap all machinery

working under heavy loads. To meet these conditions, all heavy equipment purchased by this company is Diesel-powered. A 250 hp. Chicago Pneumatic Tool Company Diesel lighting plant furnishes electricity for the entire job. Three Northwest 3½ cu. yd. shovels, powered with Murphy Diesel motors, load eleven Sterling dual chain four-wheel drive dump trucks. Beginning in July, these three shovels and eleven trucks excavated 1,000,000 cu. yds. in six weeks during the highest temperature recorded in this district in many years.

The Rohl Connolly Company, wishing to give every possible protection to their men to avoid heat prostration, equipped the Caterpillar Diesel tractors with large beach umbrellas mounted over the driver's seat. Fourteen separate air cooling units are used in their camp, bringing the temperature low enough to require sleeping under blankets when the outside air was over 100 degrees. The men are urged to drink all the water they can take, but with plenty of salt which is placed at all drinking posts. A salt tablet taken every two hours replaces the salt lost to the body in perspiration, thus preventing heat sickness. Through this terrific hot weather, these Cummins Diesel dump trucks hauled over 30 tons each load, making as many as eight loads per hour 21 hours per day, without exceeding 180 degree motor temperature. The average haul was 1,000 ft. with grades up to 7 per cent. The Diesel fuel is furnished by the Texaco Oil Company and, during this torrid summer, these Diesel dump trucks used an average of 1½ gallons of Diesel fuel per hour.

The Guy F. Atkinson Company of San Francisco was awarded the largest dirt moving job on record with their Hansen Dam contract near San Fernando, California. This dam, to check the head-waters of the Los Angeles River, will be approximately two miles in length, of the earth-fill type, with about 15,000,000 cu. yds. of excavation and placement. To complete this huge contract, this company went Diesel in a big way. Listed in their purchases of Diesel equipment are twenty Sterling 30 cu. yd. Diesel dump trucks with Cummins 150 hp. motors, two Sterling 3,000 gal. water tank trucks with Cummins Diesel motors, and Diesel tractors and bulldozers by the dozen with Caterpillar Diesel motors. Even though this big job is just getting started, twelve of the Sterling Diesel trucks and fifteen of the Caterpillar Diesels have been already put in service.

A common expression used jokingly in California is to say an individual has "gone Hollywood." When you hear of all these millions of cubic yards of dirt being moved by Diesel power, it must be said that Mother Earth has "gone Diesel."



The Grand Haven Municipal Power and Light Plant Showing the low pressure steam standby plant at extreme left and the new Diesel plant in the foreground.

GRAND HAVEN, MICHIGAN

By HARRY J. SWANSON* and J. BRYAN SIMS†

GRAND HAVEN, Michigan, once famous as the center of a huge logging and woodworking industry, was declining commercially in the late twenties to the level of a summer resort.

The appointment of a Board of Public Works in 1930, with authority to modernize a thirty-four year old municipal steam power plant on a ten year program, marked a favorable turn in the industrial life of Grand Haven. The Board proceeded without political interference, but with civic cooperation, on a program designed to provide "electrical energy at the lowest possible cost consistent with efficient service." A modern Diesel power plant was decided upon to meet these conditions and, in 1930, work was started on a new building suitable for immediate requirements, plus ample room for future expansion.

Two Model VB 6-cylinder De La Vergne engines, 22 in. bore and 30 in. stroke, rated at 1200 hp. each, direct-connected to 800 kw. Elliott alternating current generators, were put on the line early in 1930. This original installation proved the soundness of the Board's decision when it was found that the low pressure steam plant produced 6,532,000 kwh. at a cost of $.0127 per kwh. in 1930, whereas by June, 1931, the Diesel plant had produced for the month 452,200 kwh. at an average cost of $.0736 per kwh.

Industrial power users were attracted to Grand Haven by the low power rates and the ideal location, to the extent that in 1934 it became necessary to install another engine and generator of the same make and specifications as the first two. Again, in 1937, another major extension became necessary but, realizing the need for more power in a limited building space, it was decided to purchase a 2-cycle engine. The Board selected a 2250 hp., Type TS-216, 2-cycle, 21 in. bore x 29 in. stroke, Nordberg Diesel engine, direct-connected to an Elliott 2,000 kva. 2,300 v. generator for this latest extension.

The plant, as it stands today, is a fine example of efficient operation, using many ingenious economies. For example, appreciable savings are realized by purchasing and storing fuel oil in large quantities. This fuel oil is Michigan crude residual from local refineries, having a specific gravity of 22 to 28 and approximate viscosity of 500 ss. at 100° F. Fuel oil storage consists of two 100,000 gal. Graver tanks, having ¼ in. plate walls and bottoms, with 3/16 in. plate umbrella-type tops, and one 150,000 gal. Buffalo Tank Co. tank of similar construction. Fuel oil is received by rail and by boat, and is pumped to the tanks by a Blackmer pump through a 4 in. pipe fitted with a 1½ in. pipe heating coil. Thus the fuel oil is maintained at 70° to 80° F. This temperature is maintained fairly constant because the tanks are sunk into sand and in this way are well insulated.

The oil from storage is transferred by a Roper pump and is heated to 120° F. and then cleaned by a Goulds exhaust heater and centrifuge. The latter removes water, sediment, and excess wax. Immediately before injection, the fuel is re-heated to 140° F. by a jacket water heater furnished by the engine manufacturers and mounted beside the injection pumps. Listed below are the results of a typical fuel oil test made on samples from each shipment:

	Sample No. 1	*Sample No. 2*
Carbon Residue	3.12%	same
Ash	.11%	same
Flash Point	320° F.	same
Spec. Gr. Deg. B. at 60° F.	26.3	26.35
Wt. per Gal.	7.467	7.464
Chlorides as Sod. Chloride	.02%	same
Corrosion test 24 hrs	none	none
Free mineral acid	0	0

* Member of the Board of Public Works.
†Superintendent of the Board of Public Works.

The Nordberg 6-cylinder 2-cycle 2,250 hp. Diesel engine and Elliott 2,000 kva. 2,300 v. generator installed in 1937.

The average overall fuel consumption is 12 kwh. per gallon.

Waste exhaust heat is used for heating the building and for maintaining non-freezing temperatures in the old steam plant. Part of the engine jacket water is circulated through radiators and unit heaters in the building.

Lubricating oil from the engine crankcases is stored on the third floor where there is a 600 gal. tank for the Nordberg engine and a 300 gal. tank for each of the De La Vergnes. A Youngstown-Miller purifier is used to clean all the lube oil, taking 15 gal. to the batch. The clean oil is then stored under pressure in tanks of the same respective capacities as above. Thus, there is gravity head, plus air pressure, on the lube oil going to the engines which insures thorough lubrication of all bearings while starting the engines.

In connection with the Nordberg 2250 hp. engine recently installed, the following accessory equipment is used: A Woodward governor for frequency and speed control, Nugent duplex filters on the fuel line, a Viking pump for lubricating oil transfer, a Schutte-Koerting lubricating oil cooler and also heat exchanger, a Brown pyrometer used on all engines. Air filtration is through American Air filters, the temperature gauges are Motoco distance reading. General Electric supplied the switchboard and instruments and voltage regulator. The main generator, as stated above, is an Elliott 2,000 kva. 80% PF 60-cycle 3-phase 2400 volt fly wheel type. Elliott also supplied the 30 kw. exciter. Shell lubricating oil No. 269 is used for the top lubrication of the Nordberg Diesel and Shell Talpa No. 241 in the crankcase. Crane Company valves are used throughout the plant and King-Seeley telegauge fuel tank measuring instruments are installed. A big Chisholm-Moore crane services all four engines.

The original switchboard, instruments, oil circuit breakers and bus structure for the De La Vergne-Elliott sets were furnished by Westinghouse Electric & Mfg. Co. The additional switch gear required for the Nordberg-Elliott set was supplied by General Electric Co. Control panels on the main engine floor are dead front type with electric remote control. Telechron clock meters mounted in the control panel give an accurate accumulative record of the number of hours each engine has operated.

Generation is at 3-phase, 2300 volts. Scott connected transformers tie the Diesel and steam plants together electrically, the latter generating at 2-phase, 2300 volts for standby service. The industrial plants served are grouped around the fringe of the city and are fed from a 6600 v. loop circuit by a 2000 kva. transformer bank at the power house. Sectionalizing facilities are provided whereby continuous operation is assured.

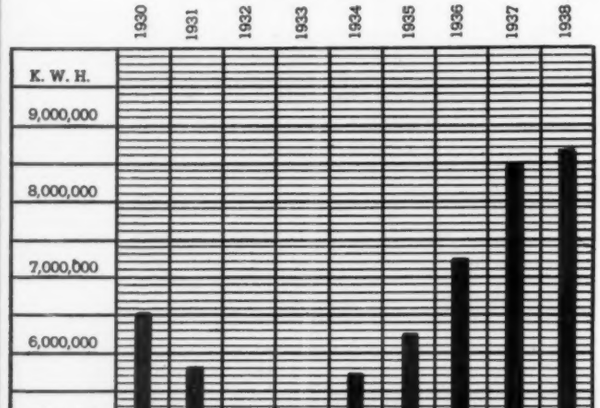
Continuous service is necessary to many of the industries, particularly those using current for electroplating, pickling, and electric furnace processes. Many of these manufacturing plants are solely dependent upon electric current supplied by the municipal plant for carrying on their processes and, by the same token, Grand Haven's industries account for the large domestic demand so vital to the profitable operation of the power plant.

Annual revenue from the industrial power load

Three De La Vergne 6-cylinder 4-cycle 1,200 hp. Diesel engines and Elliott 1,000 kva. 2,300 v. generators. Two units were installed in 1930 and the third in 1934.

Grand Haven, Michigan, Municipal Plant

KILOWATT LOAD GROWTH FOR THE YEARS
1930-1938, INCLUSIVE

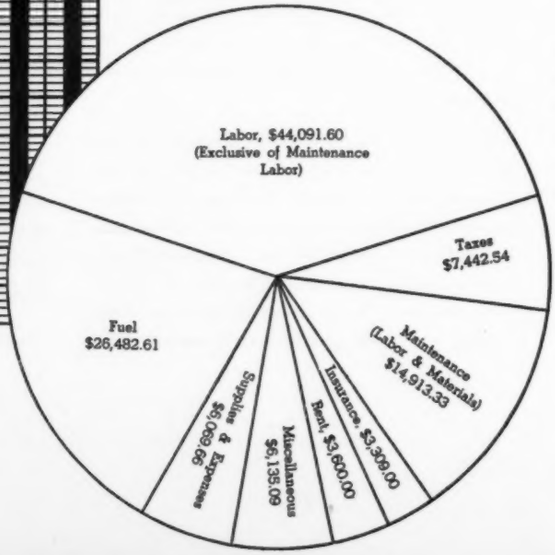


This load growth chart reflects the turn of the industrial tide of Grand Haven with the advent of low cost, dependable electric service.

Labor is for operation only and does not include $18,438.19 labor on capital investment or new construction. Maintenance for year was much greater than usual, due to deferred work which had been necessary pending the installation of an additional prime mover.

COMPARATIVE CHART

SHOWING EXPENDITURES FOR THE PRODUCTION AND DISTRIBUTION OF ELECTRIC POWER DURING THE YEAR, 1938

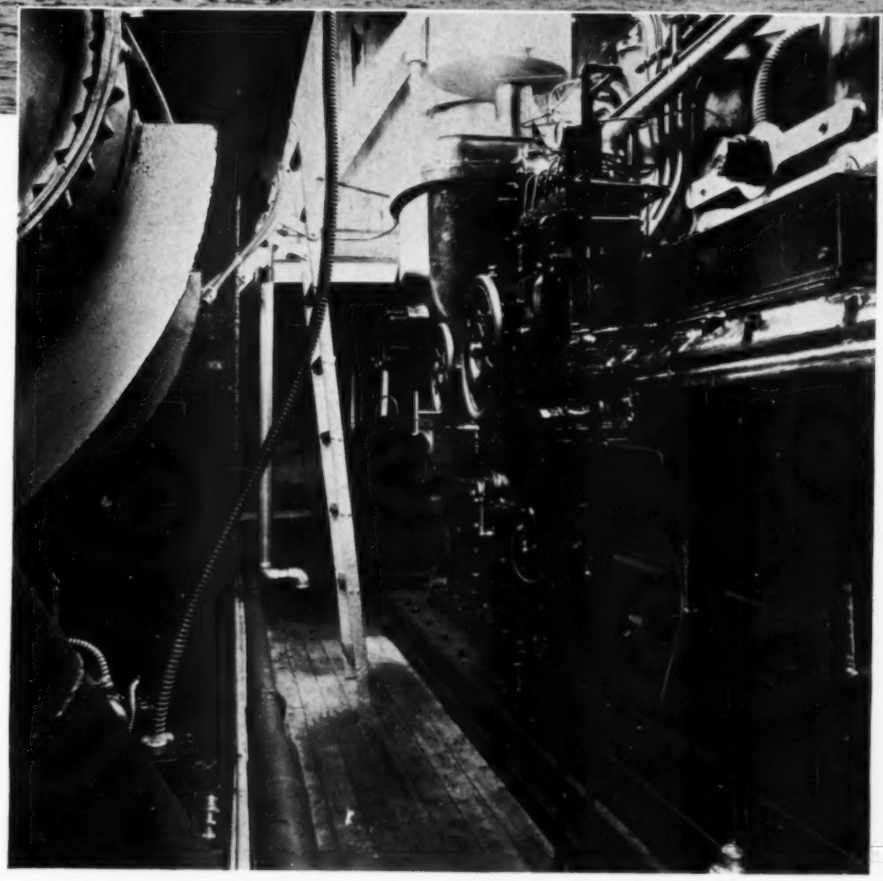


has increased from $58,092.02 in 1934 to $87,499.87 in 1938. This municipal utility pays taxes as would a private utility. It also makes voluntary contributions to the general fund which more than offset the cost of street and boulevard lighting service. The wide diversification of products and markets represented in this municipal plant's list of users also accounts for balanced budgets and the constant expansion of the community through trying years since 1930. And many of these industries did not just gravitate to Grand Haven. In order to meet their power requirements, the cooperation of the Board and engineering service of the Superintendent were and are frequently called upon.

Modern, dependable, and low cost electric service rendered by this Diesel plant is credited by citizens and operators alike for the enviable employment and residential conditions existing in Grand Haven today. At a recent dinner given by the commercial and professional men for the local manufacturers, there were many expressions of mutual appreciation, and all agreed that the municipally-owned and operated Diesel-electric plant has greatly helped to make recent years good years for Grand Haven.

"JUNO"

A Diesel Tug Conversion



The new 500 hp. Fairbanks-Morse Diesel engine recently installed in the Tug "Juno." Note Duplex Nugent filters on fuel line.

BUILT 18 years before Dr. Diesel constructed his first successful Diesel engine in 1897, the tug *Juno* has recently been converted from steam to Diesel power. The *Juno*, of 80 gross and 40 net tons, is 83.5 feet long, 18.4 feet beam, and 8.5 feet deep.

Since it was first launched 59 years ago, at Camden, New Jersey, the *Juno* has seen considerable service. As a steam tug, she was operated for many years in Pensacola Harbor. It was then sold to Morgans Louisiana and Texas R.R. and S.S. Company, who used her in connection with the car ferry across the Mississippi River at Avondale, Louisiana. Upon the completion of the Huey Long Bridge, the car ferry was discontinued and for some time the *Juno* was tied up.

In 1937, Captain Hyer purchased the tug and decided to convert her to Diesel power. His decision was largely influenced by the successful operation of the company's two Diesel tugs, the *Helmar* and the *Venice*, both powered by Fairbanks-Morse. Various makes of Diesels were considered for the *Juno* but finally Captain Hyer chose a 500 hp., five cylinder, Model 37-D-14 Fairbanks-Morse Diesel. In addition to the main engine, the boat is equipped with Fairbanks-Morse auxiliaries. So now the Hyer Towing Company can boast of three tugs powered with Fairbanks-Morse Diesel Engines. Since the installation was completed in the early part of September, the *Juno* has been used for general towing and, very shortly, it will be put into regular service between Baton Rouge and Pensacola, for the purpose of towing oil for a large, well-known oil company.

Exterior of power house. Seen standing at main entrance is Mr. L. E. Long, a veteran in rural electric lines, also present general manager of this Cooperative.

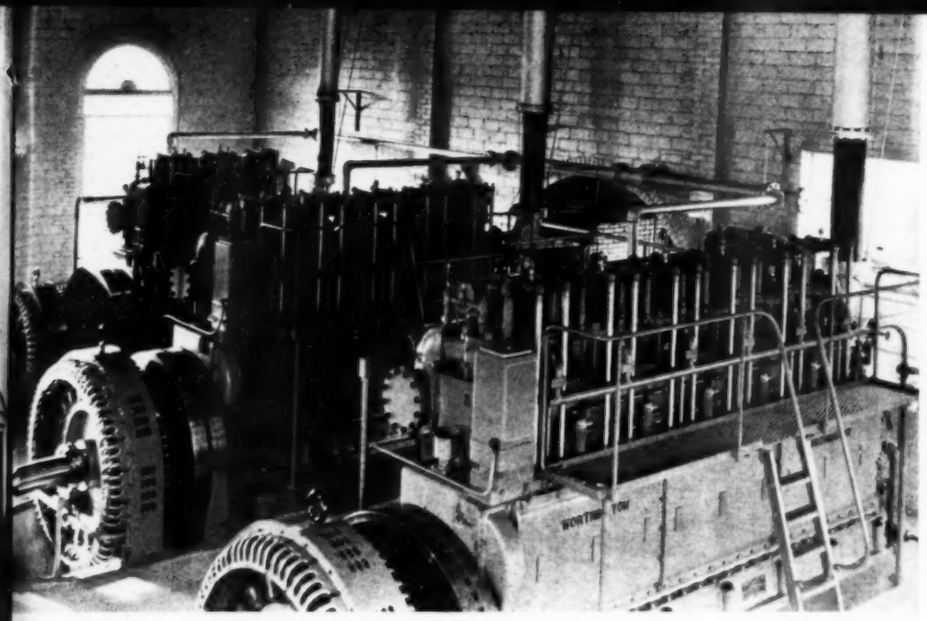
The present Plant Superintendent, Mr. Thomas Moore, Jr., on the day construction was begun.

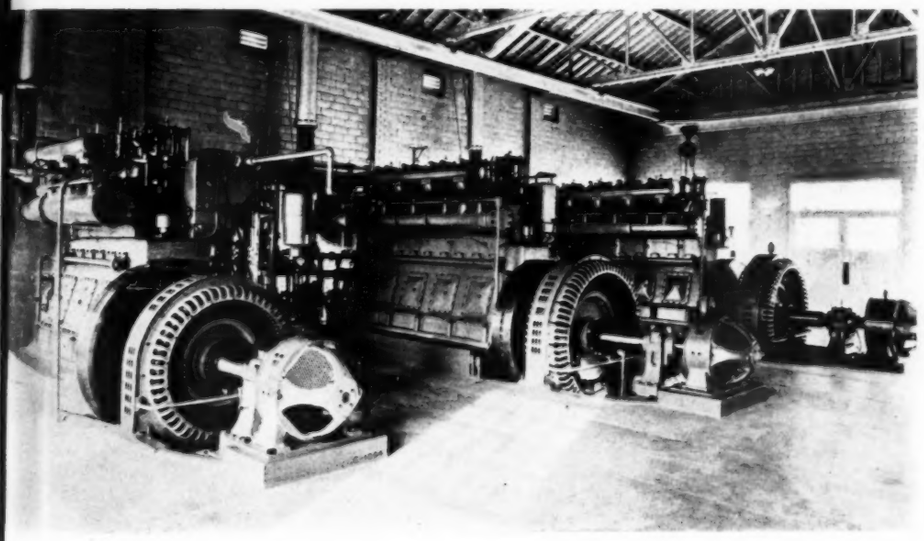
SHENANDOAH VALLEY ELECTRIC COOPERATIVE

GREAT progress toward increasing the availability of cheap electric power has been made during the three and one-half years in which the Rural Electrification Administration has been in operation. Naturally, Diesel engines have played important parts in this program and will continue to do so because of their unusual adaptability to the prevailing conditions and problems. Municipal Diesel power plants throughout the length and breadth of the United States are daily proving their complete dependability and remarkable economy to citizens of far-sighted communities. Because the impetus to building and acquiring such plants has been and is being furnished in major proportions by the Federal Government through the R. E. A. it is the purpose of DIESEL PROGRESS to acquaint its readers from time to time with representative installations of this type.

One of the most recent of these is the well equipped plant at Dayton, Va., which now serves adjacent subscribers in the Shenandoah Valley. Three Worthington Diesels of 170 kw., 285 kw. and 345 kw., respectively, furnish a total power output of 800 kilowatts with ample flexibility for varying line loads.

The engines are all Type DS, 4-cycle, solid injection units with 13¼-in. bore and 17½-in. stroke and operate at 360 rpm. They are supplied in blocks of three, five and six cylinders with all parts interchangeable except the crankshafts and camshafts, which makes the problem of spare parts much more simple and inexpensive. Maintenance routine is also standardized in this way. Each engine is directly connected to a Westinghouse generator of corresponding power with separate exciter on the drive shaft extension. Engine auxiliary equipment includes





Two general views showing the interior arrangement of the Shenandoah Valley Electric Plant and its three Worthington Diesel-Westinghouse generator units.

Maxim silencers, Vortox intake air cleaners, Leeds & Northrup exhaust temperature pyrometers and Weston electrical tachometers. All pumps, both on and off the engines, were supplied by Worthington. Lubricating oil is centrifuged with a Goulds Hydroil. This is so connected that batch as well as continuous centrifuging can be done as occasion demands. Gulf lubricating and Gulf Number Four fuel oil are used with present practice of centrifuging lubricating oil every fifty hours of engine operation. Records indicate very satisfactory economies of 12 kilowatts per gallon of fuel and from 12,000 to 13,000 horsepower hours per gallon of lube. All of the main engine units are fully protected by water and oil pressure and temperature alarms and automatic shut-down devices. Plant operating engineers are well equipped with the necessary tools, dial indicators for crankshaft deflection and crankpin bearing clearance and a Bacharach Pressure Time Drum Indicator for pulling indicator cards.

The present closed cooling system consists of heat exchangers with raw water from a nearby creek as the cooling medium. Due to excessive pumping costs, however, these are being replaced by evaporative coolers which have shown excellent results in other R. E. A. installations. A considerable additional saving in power generating cost will soon be effected in this way.

The Westinghouse switchboard and distribution panel is well equipped with all necessary instruments, such as wattmeters, voltmeters, totalizing meters and relays. Each generator has its own individual ammeter, voltmeter, power factor meter and integrating watt-hour meter to provide accurate and constant checks on operating costs and efficiencies.

Colonial design for the building was selected to harmonize with the architectural trend in this locality. It is obvious from the illustration that, aside from the ridge ventilators, there are few points of external appearance to identify it as a power house.

Present load averages 420 kilowatts but it is rising so swiftly and steadily as more and more families avail themselves of such economical power that it will not be long before an additional Diesel must be installed. Ample space has been provided for such an eventuality and it is expected that the next Diesel will have to be upwards of 1,000 kva. capacity, according to present indications of anticipated load.

Construction and installation were completed on November 21, 1937, and the plant assumed its regular load on January 29, 1938. It was originally estimated that current would be supplied to approximately 2,200 customers. After only one year's operation it now has 2,000 with excellent prospects in the near future of twice that number. Distribution lines are still under construction by two contractors in addition to the plant's regular crew. The present Plant Superintendent, Mr. Thomas Moore, Jr., whose informal picture appears on the opposite page, personally supervised the entire construction of this model generating station, with the close cooperation of R. E. A.'s Engineering Division under the charge of Mr. Franklin P. Wood.

The remarkable success of this plant and others of a similar nature indicates the vast numbers of potential customers for inexpensive electricity still to be served throughout the country. Perhaps no other phase of Federal financing to stimulate business activity and create employment is more successful or self-liquidating. In addition to the actual power generating equipment purchased it is found that an unprecedented demand is created for electrical appliances and labor-saving devices among those to taste the blessings of low cost electricity. With careful management Diesel plants such as this one will pay for themselves within a relatively short period. With present amortization charges wiped out rates will then go even lower to the mutual benefit of all concerned.

"ST. LOUIS SOCONY"

By WILL H. FULLERTON

A PAIR of 600 hp. 8-cylinder 4-cycle Busch-Sulzer direct-reversing Diesel engines operating at 300 rpm., supply the power for this new twin screw Diesel towboat which was recently added to the Socony-Vacuum Oil Company's rapidly growing inland fleet.

The boat was built by the St. Louis Shipbuilding & Steel Co. at their St. Louis yards and has a length of 137 ft., beam of 35 ft., and depth of 7 ft.

The hull is of transverse construction with extra heavy longitudinal reinforcing to provide the necessary rigidity due to the shallow draft of the boat. The hull and deck house are of all steel construction, electrically welded throughout. The boat is classed by the American Bureau of Shipping and also has met, in every respect, the requirements of the Department of Commerce, Bureau of Marine Inspection & Navigation.

The boat was designed by the Marine Department of the Socony-Vacuum Oil Company, Inc., 26 Broadway, New York City. Special models of the hull were made and tested in the Stevens Institute of Technology's test basin, prior to making final plans, and the final designs of the hull, tunnels, and rudder system were based on information secured from these preliminary tank tests.

The accommodations for the Officers are on the second deck with a spacious lounge aft. The Captain's quarters and office are forward of engine room on second deck. The crew's quartere are aft of the engine room on lower deck, the galley and mess hall being at the aft end of lower deck house.

Auxiliary power is supplied with a pair of 40 kw. Superior Diesel generating units, so that the vessel is equipped with only two makes of engines: A pair of Busch-Sulzers and a pair of Superiors. All motors used throughout the vessel are Century Electric, this being the logical choice of both the owner and shipbuilder, inasmuch as these efficient motors are made right in St. Louis.

The steering engines are McLeod and on the main deck forward are two American Engineering Company's double-barrel capstans driven through horizontal shafts by 15 hp. motors. There are two hand capstans on the after deck.

For these river towboats, operating as they do in water heavily charged with silt, a closed cooling system for all engines is necessary. Hence the installation of a raw water pump, supplied by the Gardner-Denver Co., a centrifugal of 400 gpm. capacity, passing water through a Sims heat exchanger for each engine, designed to handle the raw water at approximately 90° F. and the cooling water at engine outlet at 140° F. The two heat exchangers are cross-connected to enable both to serve one or both engines and one or both auxiliary engines. The jacket water pumps, attached to the engines, draw water from the storage tank, discharging it through the engine jackets, then through the coolers, and back to the storage tank.

Lubricating oil is stored in a pair of 200 gal. tanks in the shaft alley from where it is pumped by the Carter transfer pump, discharging to a pair of 60 gal. service tanks, one above each engine. Then it is passed through Nugent duplex filters into the lubricating systems of each engine.

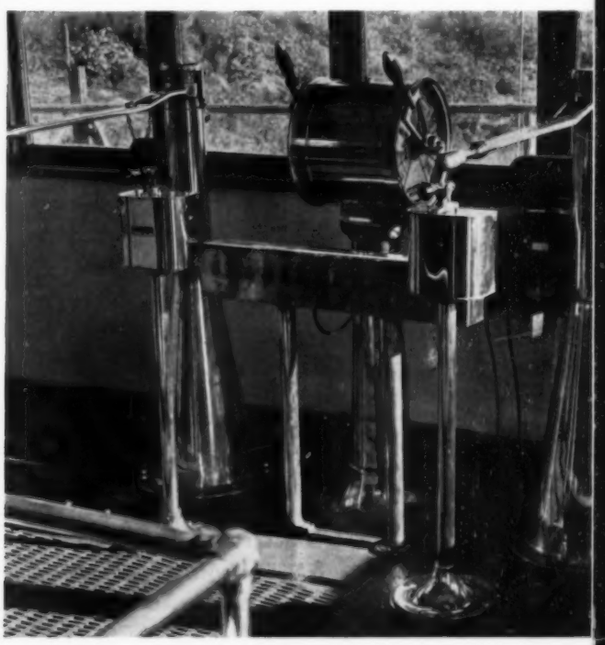
As stated above, the auxiliary sets consist of a pair of Superior Diesels rated at 63 hp, at

900 rpm., direct-connected to 40 kw. Century generators. The 150 amp.hr. Edison battery is so arranged as to take over the steering gear and running lights in case of current failure whilst under way. This battery is also used for lights and small port-service motors when the vessel is tied up.

Starting air is supplied by a pair of Ingersoll-Rand compressors rated at 42 cfm. at 275 lbs. Each compressor is equipped with its own attached pumps for cooling and lubrication. The air is stored at 250 lbs. in ten tanks. These tanks are manifolded in pairs, so that any two may be cut out. A pair of 50 gpm. Carter fuel transfer pumps take the fuel from bunker tanks and discharge to a 200 gal. service tank located in the engine room. Before reaching the engines, the fuel is filtered through large Sentinel filters. Alnor pyrometers of the round flush type are used on both main engines for exhaust temperature control.

Bilge and ballast service is handled by a 50 gpm. Carter motor-driven pump. A Fairbanks-Morse automatic water system supplies the sanitary service with an 80 gal. pressure tank, while a duplicate set supplies washing water throughout the vessel. The ordinary practice of using filtered river water for drinking is changed on this vessel and arrangements provided for taking shore water at convenient points, which is stored in a pair of 650 gal. tanks and distributed by air pressure.

At left, main engine room showing the two 600 hp. 8-cylinder Busch-Sulzers. Below, Bridge deck showing control equipment.



BURGESS ANNOUNCES A NEW DEVELOPMENT IN INTAKE AND EXHAUST QUIETING

A TOTALLY new type of noise-quieting device which is non-acoustic and can be placed at any point in the intake or exhaust system of an engine or compressor, has recently been developed by the Acoustic Division of the Burgess Battery Company, 500 W. Huron Street, Chicago. This new device is called the Burgess Snubber.

The operating principle of the Burgess Exhaust Snubber was evolved after long experimentation with various types of engines, using piezo-manometers and recording oscillographs to determine the transient pressures and velocities within exhaust manifolds immediately after the opening of the exhaust valve. Two aero-dynamic effects are involved in the operation of the Burgess Snubber. First, the fast-moving slug of exhaust gas, which is vented into the exhaust system by the opening of the exhaust valve, is trapped in a high-resistance snubbing tube. This tube is perforated radially to allow the pent-up gas to vent gradually into the first snubber chamber. At the same time, a recoil pressure from the snubbing tube serves to slow up the flow of scavenged gases and thereby prevents pressure dropping below atmospheric pressure.

The slower moving scavenged gases do not enter the snubbing tube but are diverted through a low-resistance exhaust tube in the first chamber. A second stage of snubbing, comparable to the first, removes any remaining impulses which may be present in the exhaust gases. Back pressures can be eliminated or controlled to any desired value.

The effect of the Burgess Exhaust Snubber is to prevent the sudden impact of the slug of vented gas with the atmosphere and also to stop the usual inrush of air into the exhaust pipe, after the discharge of the slug. Therefore, the sharp noise of the slug impact and the rumbling noise of the vibrating air column in the exhaust pipe are eliminated. Roughly speaking, the effect of the Burgess Exhaust Snubber on the exhausted gases is much like that of braking an automobile to a gradual stop and thereby avoiding the noise of a crash with a stationary object by avoiding the crash itself.

The same type of unit is applicable to intake and output lines of reciprocating and rotary compressors. Burgess Snubbers are available in a wide range of sizes for standard, heavy duty, and spark arresting service.

CUMMINS ENGINE COMPANY APPOINTS NEW SALES MANAGER

MR. P. E. LETSINGER, Vice-President of Cummins Engine Company, Columbus, Indiana, well-known builders of automotive, industrial, and marine Diesel engines, announces the promotion of Mr. Dave Buttles of Seattle, Washington, to National Sales Manager with headquarters at the Home Office.

For the past four years, Mr. Buttles has been the factory sales and service manager for eleven western states. He has been largely responsible for building the present strong position of Cummins Diesels in the marine field in the Pacific Northwest.

His field trips have taken him from Alaska to Hawaii and among the larger contractors, loggers, and truck fleet owners from Los Angeles to Vancouver, Mr. Buttles is known as just "Dave." Although his host of friends on the Pacific Coast will miss his cheerful, winning personality, they are glad to see his work rewarded by this promotion and know that the Pacific Coast will have a strong ally, familiar with their problems, at the Cummins factory.

One of Mr. Buttles' outstanding characteristics is his ability to impart his knowledge to others . . . to completely familiarize every man who buys a Cummins Diesel with his engine so that he will get the most efficient service from it. In Seattle, Mr. Buttles succeeded in surrounding himself with men who will make every effort to maintain the sales and service records he has set.

THE American Bosch Corporation, Springfield, Mass., announces that it is now in production on a new fuel oil filter, the development of which is of importance to both manufacturers and owners of Diesel engines.

This new product, known as the American Bosch Sealed Fuel Oil Filter, is intended for use as the final filtering unit in the fuel oil filter system that is required on Diesel engines to remove foreign matter which inevitably seems to find its way into fuel oil, either from storage or from handling operations.

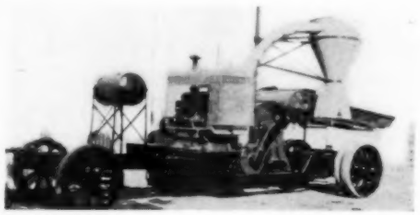
It is pointed out that the super-clean fuel oil from this new filter assures maximum life for the fuel injection equipment. By its use the finely-lapped parts such as injection pump plungers with barrels, discharge valves and the spray nozzles are protected from the destructive abrasive effects of the fine dirt particles which have been removed.

Since sealed construction plays an important part in the remarkable filtering efficiency obtained with this type of filter, it is merely replaced at intervals. The periods between replacements depend largely on the size of the engine, the efficiency of the primary filters and the fuel oil used.

The New American Bosch Sealed Fuel Oil Filter is an inexpensive unit designed for application on Diesel engines as used in trucks, buses, tractors, and in industrial service such as shovels, road rollers, cranes, generator sets, power units, marine engines.

A DIESELIZED FEED GRINDER

THE modernized Diesel marches on! Scarcely a day passes but what some interesting new development demonstrates not only the rapidly growing demand for Diesel Engines, but also throws into sharp relief the outstanding advantages of Diesel power for many industrial applications.



Bear Cat Feed Grinder powered by Hercules Diesel.

A case in point is the recent utilization of Hercules Diesel Engine Model DJXC, 3¾" x 4½", for powering the Model 1-AS Bear Cat Feed Grinder manufactured by the Western Land Roller Company of Hastings, Nebraska. The installation was made for the A. Moffett Company, generally considered one of the largest cattle feeders in California. In addition to operating feeding pens and lots in Stockton, Mantica, Fresno and Bakersfield, California, the Moffett organization has plants in Salt Lake City, Carson City, Nevada and other points in the West.

The Hercules Diesel was chosen for operating the Bear Cat Combination Cutter and Hammer Mill for several outstanding reasons. As is well known, reduction of fire hazard is extremely important where there is dry hay. Another consideration was that in order to operate at highest efficiency a constant speed must be maintained in grinding the feed. The characteristic ability of the Hercules Diesel to "hang on," because of its exceptional lugging power, was a very important factor in this connection. One plant of the Moffett Company, located at Mantica, feeds 6,000 to 8,000 head of cattle. The Bear Cat Mill is capable of handling as high as four to five tons of feed hourly, and here the dependable power and the notable economy of the Hercules Diesel Engine was of paramount importance. The statement was made that a gasoline engine of the same displacement would consume from three to five gallons per hour at a fuel cost of 15 to 18½ cents per gallon. The Hercules Diesel operates on one to two gallons of Diesel fuel per hour at a cost of 5½ to 9 cents per gallon.

Another view of the Bear Cat Feed Grinder.

It was pointed out also that the Diesel has a decided advantage over electric power, not only in lower cost per operation, but because it is a portable outfit, whereas in practically every case where electric power is used the unit is permanently stationary.

Because of the outstanding performance of the Bear Cat Grinder powered by the Hercules Diesel Engine, it is reported that additional units will be ordered.

SHENANDOAH IN THE MARKET

IN reference to the article on the Shenandoah Valley R.E.A. Cooperative on pages 54 and 55 of this issue, Mr. Thomas Moore, Jr., Superintendent of the plant, writes as follows: "We are in the market for a 1,000 hp. Diesel engine, for our load has greatly increased since I have written you last. In addition, since I have written the article for your magazine, I have done away with my centrifuge and have installed a Youngstown-Miller oil purifier. I shall use my centrifuge on a lower grade fuel oil, and therefore not lose the investment in it."

NEW COMPANY TO MARKET DIESEL LOCOMOTIVE UNIT

HAMILTON, OHIO—Development of a hydraulic transmission unit for Diesel locomotives was announced here today along with the organization of the Hydro Transmission Corp.

The device was described by G. A. Rentschler, director, as "revolutionary and a remarkable forward step in engineering." It will be manufactured, under contract, by the General Machinery Corp., a parent concern.

The units are designed to replace mechanical or electrical transmissions currently employed on Diesel engines, and are intended, company spokesmen said, for heavy-duty operation in industrial and switching locomotives and self-propelled coaches of from 300 to 1,000 horsepower.

EFFECTIVE November 1, 1938, the Sterling Motors Corporation of Milwaukee, Wisconsin, acquired the assets of the truck division of the Fageol Truck & Coach Company of Oakland, California.

A Sterling factory branch will be opened at 470 Bayshore Boulevard, San Francisco, on or about February 1st to serve both Sterling and Fageol owners in Northern California and the Pacific Northwest.

DIESEL PROGRESS

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AN ADVERTISEMENT TO AID THE TRUCK DRIVER

THE driver of a truck is so vitally tied up with the success of any company's hauling, and he has so close a bearing on the public's attitude toward truck maintenance, that the International Harvester Company occasionally devotes a magazine advertisement to the truck drivers of America.

Such a page is illustrated above. A striking piece of copy with a message that should be a good will builder for the man and his vehicle. This advertisement appeared in the January issues, in full color, of the *Saturday Evening Post, Collier's Weekly, Life* and *Fortune.* In black and white it also appeared in many other magazines on the International Harvester schedule. Total circulation of all magazines used—eleven million copies. A 28" x 38" enlargement in color may be obtained from the International Harvester Company on request.